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ANNUAL
OF THE
UNIVERSAL MEDICAL SCIENCES
AND
ANALYTICAL INDEX.

A YEARLY REPORT OF THE PROGRESS OF THE GENERAL SANITARY
SCIENCES THROUGHOUT THE WORLD.

EDITED BY

CHARLES E. SAJOUS, M.D.,
PARIS,

AND

SEVENTY ASSOCIATE EDITORS,

ASSISTED BY

OVER TWO HUNDRED CORRESPONDING EDITORS, COLLABORATORS,
AND CORRESPONDENTS.

Illustrated with Chromo-Lithographs, Engravings, and Maps.

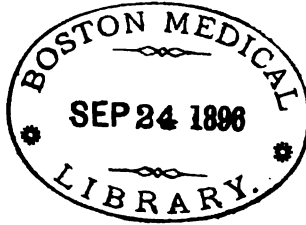
VOLUME II.



1896.

THE F. A. DAVIS COMPANY, PUBLISHERS,
PHILADELPHIA, NEW YORK, CHICAGO.

AUSTRALIAN AGENCY: MELBOURNE, VICTORIA.



1572

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Philadelphia, Pa., U. S. A.
The Medical Bulletin Printing-House,
1916 Cherry Street.

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DISEASES OF THE BRAIN.

By LANDON CARTER GRAY, M.D.,

AND

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ASSOCIATE EDITORS,

NEW YORK.

Localization.

WHEN last year's ANNUAL appeared, but a few pages of Charcot and Pitres's work on the disputed points of localization had been made public. An outline of their contents was given, the preference for clinico-anatomical over experimental methods of investigation emphasized, and sound principles enunciated as a guide for workers in neurology.

The portion since published represents a summary of the life-work, in a congenial field, of a master in the domain of neurology. It contains much that will constitute a permanent and almost invaluable addition to our knowledge of the subject. As might be inferred, however, of the teachings and opinions of one possessing such a striking, and in some respects unique, individuality as Charcot, there are many dicta which will meet with some opposition in their unqualified acceptance.

At the session of the American Neurological Association, ⁸⁹_{Oct. 10, '96} Charles K. Mills, of Philadelphia, opened an instructive discussion on cortical localization in the light of researches founded upon the methods of Golgi, and particularly those made by Ramón y Cajal, Van Gehuchten, Schaeffer, Andriezen, and others. He held that, as shown by Forell and Manson, we have been too long handicapped by prevailing ideas of cell-action and by theories of the parts played by the cell-bodies as originating centres. Impulses are transmitted and transferred by processes as well as by cell-bodies, and the function of the latter is chiefly trophic. The subdivision of the cerebrum into physiological lobes—higher psychological, motor, sensory (meaning for the representation of cutaneous and muscular sensations), visual, auditory, olfactory, gustatory, and naming—remained for the practical purposes of the physician and surgeon the best. He did not believe with Andriezen that it was necessary to regard the ambiguous and great pyramidal cells of this region whose

apical processes received the terminals of the fillet radiations as the first sensory cells of the cortex. Indeed, he regarded it as important to rid ourselves entirely of the idea of sensory cells and motor cells; but to abandon separate sensory and motor localization would, he believed, necessitate the abandonment of visual, auditory, gustatory, and other subdivisions of the cortex. The cerebro-sensory area,—that is, the area of representation for skin- and muscle- sensations,—both cortical and subcortical, would be, from his point of view, that part of the cerebrum where the fillet radiations concerned with these sensory excitations in their most compact forms are nearest to the surface of the brain, and therefore this region might continue to be destroyed as it had been by him, as in the postero-parietal, quadrate, and fornicate convolutions. Destruction of this region, especially if bilateral, caused more or less permanent loss or impairment of sensation.

Dana, of New York, still held to the view (sustained last year ²⁴²_{Dec., '94}) that the motor and sensory functions were practically united. He had directly irritated the motor cortex and produced sensory disturbance associated with motor disturbance. The whole weight of clinical evidence, the surgical operations, the tumors, and the softenings indicated that these two functions were essentially identical anatomically.

Putnam, of Boston, thought that the convolutions in advance of the fissure of Rolando, the function of which we ordinarily associated with localized movements, had also to do with sensation, and that the function of sensibility was very widely distributed. He alluded to the fact that a sensation would make its way from a minute portion of the spinal cord that was left; and in the brain, if one channel were cut off, it would make its way into other channels. Sensibility would seem to be rather peculiar in the fact that it is almost always related to something else.

Starr, of New York, argued that a lesion of a limited area of the so-called motor zone inevitably produced, in almost every case, more or less disturbance of sensation. He considered that he was mistaken in 1890, when he maintained that sensations were received only behind the fissure of Rolando. He believed with Dana that there were disturbances of sensation produced by small lesions anterior to the fissure of Rolando, and that the sensory area of the body corresponded exactly with the motor area, so far as could be determined clinically.

Dercum, of Philadelphia, expressed the opinion that the various centres of the cortex, as we knew them clinically and pathologically, were simply highways of ingress and egress to the general cortex. General biological considerations also would

negative the sharp differentiation of cells into special functions. Nerve-protoplasm reacted to certain forces; and to say that one cell would react to one mode of motion and another to another was, to his mind, unphilosophical, and not borne out by general biological considerations.

Knapp, of Boston, thought the whole of our knowledge of the neuron went to show the very pronounced dependence of the motor neuron upon the sensory neuron. In the primary neurons it had been clearly proven that the terminal processes of the axis-cylinder of the sensory neuron were closely connected with the apical processes of the motor neuron in the cord.

Motor Centres.—Charcot and Pitres in the volume referred to express the view that the only motor centres positively known to-day in man are those of the upper and lower extremities, the face, and the tongue. Other motor centres regarded by some observers as definitely localized are not considered as sufficiently supported by evidence to warrant a definite conclusion,—namely, (1) phona-tion, (2) rotation of the head, (3) conjugate deviation of the eyes, and (4) elevation of the upper lid.

The experimental deductions of Ferrier, Duret, and Krause, confirmed by Massini, Semon, and Horsley, locating the cortical motor centre for the larynx in the antero-inferior part of the prefrontal gyrus, are considered as unsatisfactory and the centre as being as yet problematical, the reported observations having been too limited to justify any positive conclusions whatever. Seguin's hypothesis of a cortical laryngeal centre in the foot of the right third frontal convolution is considered altogether untenable, in view of the numerous lesions recorded as destroying this region with no resultant aphonia. The theory of a bilateral symmetrical centre in close proximity to the area for the tongue and lower face is considered most plausible, but not yet demonstrable. The same absence of sufficient pathological and clinical confirmation is adduced as an argument against the acceptance of Ferrier's teachings, confirmed by Beevor and Horsley, that the centre representing rotation of the head is located in the posterior part of the first frontal convolution; of a centre for conjugate deviation, believed by Grasset and Landouzy to be in the neighborhood of the infra-parietal lobule, and by Wernicke and Henschen to be in the infra-parietal lobule itself; finally, of a centre for elevation of the upper eyelid located by Landouzy and Grasset in the angular gyrus.

Visual Centre.—Mey¹²¹⁴_{No. 2, '96} relates the history of a case of much interest in its bearings upon the visual area. A mason, aged 16 years, fell a distance of 2 metres (6½ feet), striking the back of

his head on a trowel. The result was a complicated fracture with depression of bone, the size of a thaler, at the junction of the right parietal bone with the occipital and temporal, at a point corresponding to the anterior part of the right occipital lobe. There was also a wound of the transverse sinus, and the brain-surface appeared bruised. The bone-fragments were chiseled out and the wound tamponed, surgical recovery occurring promptly and without incident. Severe headache, however, began in a few days, with associated diminution of vision and hearing. The deafness persisted for a short time only, but the defect of vision remained. He could see only with difficulty, soon tired on attempting to read, and the defect of vision to the left (hemipopia) was so marked as to cause vertigo and uncertainty of gait. He was found to have lost entirely the left sides of the visual field, with concentric diminution on the right, the eye-ground being normal. The symptoms were in accord with Munk's experimental conclusions. Starr, ⁵⁹_{Dec. 2, '94} in a paper upon the subject, quotes the tendency of recent opinion as favoring the region of the calcarine fissure of the occipital lobe as being the primary cortical visual centre, the angular gyrus having nothing to do with vision proper.

Common Sensation.

Much space and careful analytical study is given by Charcot and Pitres to the various disturbances of common sensibility in their relations to lesions of the cortical motor zone. The theories of Hitzig, Nothnagel, Schiff, Munk, Bastian, Ferrier, Bechterew, and Horsley, from the physiological and experimental stand-point, are elaborately reviewed and critically contrasted with the findings and deductions of the clinico-pathological school. In connection with this subject the authors present the results of their own observations in fifty-four cases of various cortical monoplegias, made with reference to the co-existence of disturbances of sensibility. They announce the conclusion that sensory phenomena are not superimposed upon motor and that they are transient, the anæsthesiæ which sometimes accompany the motor paralyses of cortical origin being mostly functional, analogous, if not identical, with hysterical anæsthesia; they are superadded phenomena and accidental, not depending upon the lesion of the Rolandic region and playing no part pathologically.

M. A. Starr and A. J. McCosh, of New York, ⁵_{Nov. '94} report a case bearing on the location of the muscular sense in the brain. It was a case of traumatic epilepsy, for the relief of which a small angioma of the pia, covering a space of three-fourths of an inch in diameter, was removed from a point on the left side, between

one and two inches posterior to the Rolandic fissure, posterior to the posterior central convolution, and about at the junction of the superior and inferior parietal convolutions. The cortex seemed normal, but was explored by puncture to ascertain whether or not there was an underlying cyst. It is possible, also, that the cortex was slightly lacerated in the ligation of the mass of vessels. Immediately after the operation the patient became very markedly ataxic in his right hand and arm, and could give no statement as to the position of these members when his eyes were closed. The muscular sense was alone affected, as tactile sensibility and motor power were intact. The lower limbs were unaffected, as were also the face and eyes; the case was a clear-cut instance of localized paralysis of the muscular sense. The condition continued as above for about three weeks, and then gradually disappeared. Two months after the operation the patient seemed perfectly well.

Contejean ⁸⁶⁰_{June 15, '96} shows that ablation of the motor zone of the brain of a dog produces not only a diminution of tactile sensibility, but also of reflex sensibility.

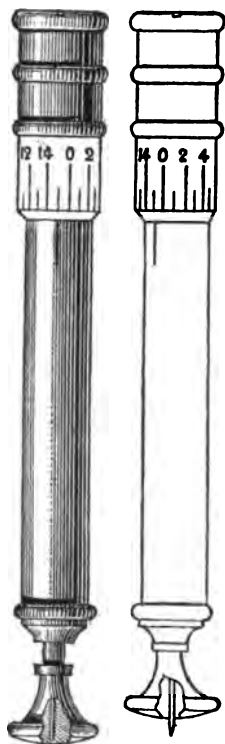
Allochiria.—Examples of false reference of pain, or allochiria, are published by S. Weir Mitchell. ⁹_{Mar. 16, '96} A woman, 62 years of age, let a heavy stove-plate fall on the right foot, striking the toes and bruising the great toe and the adjacent one. On the reception of this injury she at once felt acute pain in the left leg (the uninjured side) at the junction of the upper and middle thirds and extending downward into the foot and upward to the thigh. This pain was so sharp as to distract her attention from the injury received on the right foot, and the referred pain has survived long after the seat of the originating cause has ceased to be painful. It is becoming lessened by the use of galvanism and friction.

The woman has lost flesh since the accident; she sleeps poorly; the eyesight is defective. The left tibia is tender in the middle third, the leg is more florid, and the temperature higher. The left tibia is more sensitive than the right, and the tibial group of muscles shows a slight decrease to the faradic current.

Another instance is mentioned in which a shell wound of one leg at once gave burning pain in both feet, in the right arm, and right pectoral region. In another case a wound of the testicle was referred to the back, where alone pain was felt. In a shell wound of the left thigh the pain was referred to the same area on both thighs. The author thinks it difficult to explain these symptoms, and especially the persistency of certain of these transferred impressions, for it is a law of the receiving centres that when the cause of the pain ceases the feeling of being hurt ends.

A new instrument to measure the sensibility of the skin to pain is presented by O. Motschutkowsky, of St. Petersburg. ⁴⁵²
The instrument is held like a pen or pencil and the surface of the button pressed over the spot to be examined. The examination is begun with the figures at the bottom of the division, and if the patient does not feel anything but the contact of the algesimeter a screw is turned until there is a distinct sensation of pain.

Cerebral Anatomy, Histology, and Experimental Pathology.—



NEW ALGESIMETER.
(MOTSCHUTKOWSKY.)
*Nouvelle Iconographie de la
Salpêtrière.*

In a note relative to the pathology of tactile impressions, E. C. Spitzka, of New York, ⁶_{Jan. 19, '96} states that it is known, partly from Veyssière's experiments and partly from confirmatory pathological observation, that the fibres conveying tactile impressions are chiefly concentrated in the posterior division of the internal capsule. Meynert, ²¹⁵²₂₁ whose anatomically based presumptions have, in many respects, anticipated the results of actual observation, entertained the belief that this portion of the internal capsule was continued in the outer third of the pes pedunculi, the descending pyramidal tract, and reached the posterior columns of the cord through his so-called "upper fine-bundled decussation of the pyramids." On Meynert's hypothesis, then, the connection between the posterior and "sensory" columns of the cord and the posterior part of the internal capsule was clear. Flechsig, however, showed that the true pyramidal tract has no connection with the so-called upper decussation, and the conclusion was somewhat hastily drawn that Meynert's theory of a connection between the posterior columns and

the cerebral hemispheres was to be abandoned. In reality, Meynert's hypothetical tract requires but two topographical modifications to accommodate it to what is to-day demonstrable in any series of transverse and longitudinal sections of the brain-isthmus. Under this term he includes the axial parts of the brain; in other words, everything not comprised in the cerebral hemispheres and the cerebellum.

Meynert's hypothetical tract may be re-established by changing

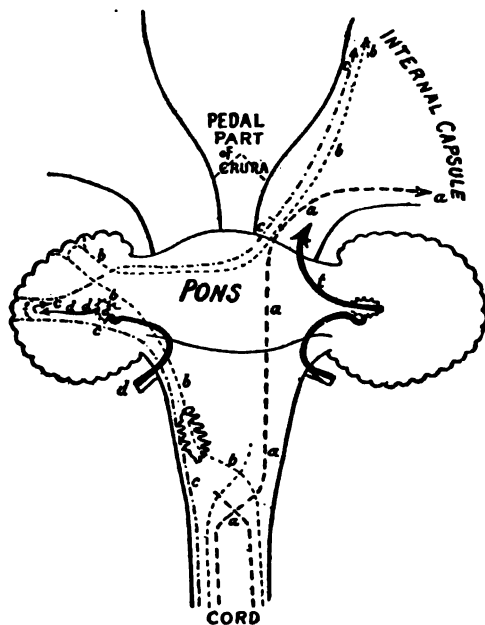
the nomenclature of the sensory decussation and substituting "stratum intermedium" for "outer part of the pyramidal and peduncular tracts." No uncomplicated lesion of this tract is recorded in the literature of focal brain-lesions. Spitzka has been fortunate enough to observe one case since he first proposed the rehabilitation of Meynert's theory with the modifications here laid down,⁵⁹ and, as far as it goes, the deductions to be drawn from it coincide remarkably with the anatomical theory. As he proposes to publish the case in full when the microscopical analysis shall have been completed, he now mentions only the salient points. A man with moderate indications of atheromatous degeneration of the vascular system had had a sudden "seizure" while straining at stool, accompanied by complete right hemianæsthesia. Spitzka examined him two years after the attack and found that the tactile sense had improved, but not to such an extent as to permit the man to resume his vocation; he had lost the faculty of mechanical co-ordination without losing the sense of equilibrium or resistance. As there was contralateral facial palsy and marked difficulty of speech, approaching anarthria in its character, he diagnosed a hæmorrhage of the pons. Two years before his death he had another seizure of a transient nature, and several lesser ones followed at irregular intervals, the patient dying with terminal symptoms of paraplegia and amblyopia. A number of recent necrotic and cicatrized foci, with several very small hæmorrhages, were found in various portions of the brain; an old pigmented cicatrix was found replacing the right stratum intermedium and involving the facial nucleus, ending at the raphé.

When it is borne in mind that those centripetal fibres which, partly derived from Flechsig's direct myelo-cerebellar tract and partly from the posterior columns through the olivary decussation, run into the cerebellar hemispheres, and that from the latter the transverse pons-fibres originate, to apply themselves to the pyramidal tract and ascend to the brain through the pes pedunculi, it must be apparent that the great sensory tract united, or nearly so, in the cord, and widely separated in the oblongata and pons, becomes reunited in the pes pedunculi. This relation is best expressed in the diagram on next page. Inasmuch as the sensory tract separates into two divisions,—one running directly through the brain-axis to the posterior capsule, the other deviating from the direct course to enter the cerebellum, which ganglion mediates as a connection of auditory and posterior column-fibre,—it seems legitimate to assume that the former division is the tactile and the latter the equilibrium sensation tract.

The influence of traumatic inflammation of the cerebral

cortex upon the excitability of the motor centres forms the subject of a paper by Bechterew,⁷⁵ Jan. 1, '96 who determined the minimum intensity of an electric current producing the feeblest muscular shock as well as an epileptiform attack. He sutured the operation wound, and opened it some days later when the paralysis had diminished, and laid bare the corresponding point of the opposite hemisphere, comparing the healthy with the operated side. He found that the instability of the latter had greatly increased,—a current which scarcely caused a shock on the healthy side giving

rise to an epileptic attack in the hemisphere injured. In addition, the destroyed centres were, little by little, replaced by portions of the neighboring cortex; resection of these secondary centres was followed by the development of new substitutes from the most adjacent parts, if these latter contained centres of other movements. He concludes that inflammation consecutive to cortical lesions delays the latent period of excitation, while the destruction of the centres of the opposite side diminishes the hyperexcitation of the side first injured.



LOCALIZATION OF TACTILE IMPRESSIONS. (SPITZKA.)

Diagram of the tactile and equilibrium tracts. a, tract from posterior column through planum decussation to posterior part of internal capsule; b, tract from posterior columns through decussation of olivary fibres to cerebellum, thence through pons to frontal lobes and great ganglia; c, direct myelo-cerebellar tract; d, auditory fibres to dentate nucleus and connections; e, its continuation to tegmentum.

Lancet.

W. A. Turner⁴⁷ Feb. 7, '96

observed the following results from experimental destruction of the tubercle of Rolando in the medulla of the monkey: (1) defects of sensibility over the distribution of the fifth cranial nerve on the side of the lesion, and (2) alternations in the sensibility of the body and limbs on both sides. 1. In the area of the distribution of the fifth cranial nerve there was defect or abolition of all forms of sensation in the cornea, and the skin and mucous membrane supplied by that nerve. The loss of sensibility was due to the destruction of the so-called "ascending" trigeminal root where it lies upon and forms the

superficial white stratum of the Rolandic tubercle. No "trophic" changes occurred in the eye. The pupil on the side of the lesion was contracted, and after one experiment a very decided narrowing of the palpebral fissure on the same side was observed. The existence of pupil-dilating fibres in the ophthalmic branch and sensory trunk of the trigeminus was thus confirmed, and their presence in the so-called "ascending" root has been established by these experiments. 2. As regards the sensory changes in the body, the author found that on the side of the lesion there was no apparent evidence of the presence of a sense of touch or of localization, while the sense of pain was retained. On the side opposite to the lesion tactile impressions were localized invariably, while there was loss or defect of the sense of pain, as such, although the site of irritation was accurately localized.

T. Starlinger, ⁷⁵ ²⁴² _{Neurol., Oct.} from a microscopical examination of the medulla of dogs, after trephining of the basilar portion of the occipital bone, found that the pyramids had been completely severed. He therefore concludes (1) that the pyramidal tracts of dogs have only subordinate importance for locomotion; (2) that in dogs there must still exist a motor pathway for the transmission of impulses from the cerebral cortex to the muscles, which tract does not have its course within the pyramids.

The last of the larger sections in the work of Charcot and Pitres is devoted to the study of limited atrophies of the motor zone consecutive to old amputations of the extremities. Dickson found no atrophy of the brain in four subjects where amputation had been performed from two to fifty-three years before death. Vulpian was not more successful. Later observers reported changes, but many observations are valueless since the amputation followed congenital deformities and acquired atrophies of the limbs. To be of any value we must limit our study to cases in which cerebral atrophy, if it exist, can be traced to loss of limb.

The authors cite 37 cases of old amputations,—atrophy more or less marked in motor zone of opposite side in 22 cases; unchanged in 15 cases. Analyses of these cases do not make it clear why atrophy is present in some and none in others. They seem to demonstrate that the cerebral atrophy is not the result of an ascending degeneration. The amputation of a limb is always followed by a unilateral atrophy of the cord-segment corresponding to limb amputated; above this region the gray substance and the white columns do not show alteration. These atrophies are therefore not constant enough nor sufficiently circumscribed to aid in the determination of functional topography of the cortical motor zone.

The experimental degenerations following unilateral lesions of the cortex cerebri in the monkey formed the subject of a communication recently made by V. Horsley to the Royal Society of England, ^{2095 99}_{98, Sept. 19} on work done by E. Lindon Mellus, at the pathological laboratory of University College, London. The animal used was the bonnet monkey (*Macacus sinicus*), the object of the experiments being an attempt to trace by the anatomical method the degenerations resulting from minute lesions of the cerebral cortex in distant parts of the brain and in the spinal cord, and so far as possible to determine the destinations of the various fibres concerned. The lesion, in each case, was made in the motor area of the left hemisphere. Fourteen successful operations were performed, three being lesions of the hallux-centre, four of the thumb-centre, and seven of four separate centres in the facial area. The wound healed by first intention, and but slight and transient paresis resulted. The animals were killed in from ten to thirty-five days, the brains and cords hardened in Müller's fluid and stained by the Marchi method.

Mellus called attention to the fact that the distribution of the degenerate association fibres in the thumb-lesions corresponded with the measurements made by Bevan Lewis of the corpuscles of the fourth layer of the cortex in this region,—that is, that coarse fibres were distributed to the upper part of the motor area and fine fibres to the lower part. In four of the experiments (one thumb and three facial) neither pyramidal fibres nor fibres connecting the nuclei of the cranial nerves directly with the cortex were found to have degenerated. Yet in each of these cases the characteristic movement was obtained from stimulation of the area removed quite as readily as in any other case. The degenerate fibres passing through the internal capsule in these cases apparently belong to two distinct systems, which are also more or less represented in the other experiments. One of these, composed almost entirely of fine fibres, passes from the posterior limb of the internal capsule into the outer surface of the optic thalamus, and represents the corona radiata thalami. These fibres are to some extent mixed with the pyramidal fibres in the posterior limb of the internal capsule, but are mostly situated in the posterior third, and, as they pass from there into the thalamus, make room for the entrance of the sensory (non-excitabile) tract. The other of the two systems referred to, largely composed of coarser fibres, passes through the internal capsule into the crus, and apparently ends in the substantia nigra. These fibres are of much the same calibre, and apparently occupy the same position in the internal capsule and crus as the true pyramidal fibres.

Both these tracts appear to arise in all portions of the motor cortex coming within the range of these experiments. All the degenerated pyramidal fibres from the hallux- and thumb- lesions were found to enter the capsule at or near the posterior extremity, while the corresponding fibres from the facial lesions entered the capsule at or near the anterior extremity, and the former were displaced forward and the latter backward until in the lower levels of the capsule they all found a place in the middle third of the posterior limb. It is also shown that a line can be drawn from the fissure of Sylvius upward, so dividing the motor area into two parts that all the facial lesions from which fibres enter the anterior portion of the capsule would be in the anterior division, and all the hallux- and thumb- lesions from which fibres enter the posterior portion of the capsule would be in the posterior division. In the movement of the facial fibres backward between the upper and lower levels of the capsule they would necessarily, at some level, envelop the genu, which would account for the fact that they have always been described as occupying that position. The location of these degenerations in the internal capsule corresponds very closely with the results of excitation of the fibres in the living animal of the same species (Beevor and Horsley). In all the cases in which there was coarse degeneration in the internal capsule it was, with two exceptions (both hallux cases) grouped on the outer edge of the capsule. Attention is also called to the fact that a large proportion of the coarser fibres passing down through the capsule enter the substantia nigra, and these experiments show this tract to be nearly or quite as large as that passing down into the pyramid. These are apparently fibres which have been looked upon as pyramidal, and, as the "pyramidal tract" has been shown to be even more extensive in the medulla and below the decussation than in the internal capsule, it follows that the fibres passing to the substantia nigra are probably replaced by others arising at lower levels. These degenerations show that in the monkey the facial fibres are situated in the middle third of the crus, in which they are mingled with the fibres of the pyramid and that they do not occupy a space by themselves mesial to the pyramid.

Cerebellum.

J. S. Risien Russell, whose extensive experimental researches upon the functions of the cerebellum were noted in review in the *ANNUAL* for 1895, has published an additional series of papers bearing upon the same subject. ²⁰⁸⁵_{v. 2, p. 819, '94} Further studies are cited in confirmation of the views originally expressed and already noted.

A. Biedl ⁷⁵_{nos. 10, 11, '96} performed section of the inferior cerebellar

peduncle on young cats, then studied the degeneration of the descending tracts of fibres by Marchi's method. He found, dependent on the lesion, degeneration in the following tracts: 1. Posterior longitudinal fascicles, some degenerated fibres of which contribute to the formation of roots of cerebral nerves. 2. Lateral anterior root-zone, continuing into the antero-lateral farther caudal into the anterior column of the cord. 3. Lateral root-zone, continuing into the area which forms part of the lateral pyramidal tracts, which shows that these contain a cerebellar system of fibres. 4. Fibres of anterior root-bundles of spinal nerves. 5. *Fibræ arcuatæ internæ* which connect the cerebellum, by way of the corpus restiforme, with the inferior olive of the opposite side. All these tracts conduct centrifugally, having their cells of origin in the cerebellum.

Mingazzini⁷⁶_{Aug. 1, '96}; ⁷⁷_{Oct. 1, '96} states that the cause of atrophy of the opposite half of the cerebellum with unilateral cerebral lesions is to be sought in the accompanying affection of the tract whose course is the thalamus and red nucleus of the same side and the peduncle of the opposite side. No single case of crossed cerebro-cerebellar atrophy has been found on record where the thalamus on the side of the cerebral lesion was intact; while in two cases of Jacksonian epilepsy quoted there was in the one atrophy of the ascending parietal convolution unilaterally, with very slight atrophy of the posterior part of the thalamus of the same side and of the pyramidal tracts on the opposite side; no cerebellar atrophy. In the other, although there was no difference in weight of the cerebral hemispheres, the thalamus of one side was markedly atrophied, here the cerebellum of the opposite side was also markedly atrophied. It is therefore concluded that atrophy of a certain part of the thalamus causes crossed atrophy of cerebellum, but lesions of one side of the brain without lesion of the thalamus do not cause crossed atrophy. There is a tract divisible into three parts: (1) from cortex to thalamus, (2) from thalamus to red nucleus, and (3) from red nucleus *via* decussation to opposite half of cerebellum. Cases in which unilateral lesion of cerebrum is not followed by crossed atrophy of cerebellum would thus be easily explained either by the probability of some of the three portions of the tract escaping or by the necessary part of the thalamus not being involved.

Aphasia.

Naming Centre.—"The Naming Centre, with Report of a Case Indicating its Location in the Temporal Lobe," formed the subject of a paper by C. K. Mills and J. W. McConnell, of Phila-

delphia. ²⁴²_{Feb., '96} The setting apart of a special area with the designation naming centre is in accordance with the views of Broadbent, Küssmaul, and Charcot. According to Broadbent, the formation of an idea of any external object is the combination of the evidence respecting it received through all the senses. For the employment of this idea in intellectual operations it must be associated with and symbolized by name. The structural arrangement connected with this process he supposes to consist in the convergence from all the receptive centres of tracts which go to a convolutional area on the sensory side of the nervous system, which may be called the naming centre. Its correlative motor centre is the propositionizing centre, in which names or nouns are set in frame-work for outward expression, and in which a proposition is realized in consciousness or mentally rehearsed. The destruction of this centre would cause loss of memory of names or nouns. As a provisional guess, Broadbent placed this centre in an unnamed lobule situated on the under surface of the temporal lobe, near its junction with the occipital lobe, where he believed fibres from all the perceptive centres converge to and end in the cortex of this region. Other names which have been applied to this centre or area are idea-centre and concept-centre. Some authorities, as Ross and Bastian, do not consider that it is necessary to have a particular region of the brain in which concepts are elaborated and symbolized by name; but even these authors acknowledge a special development of the cortex for concepts and names, though they would not restrict it to an isolated area.

The following case seems to be convincing as to the existence and localization of this naming or idea-centre, not only supporting the separate localization of such a region, but also confirming Broadbent's speculation as to the position of this centre in the temporal lobe:—

The patient was a married woman, 45 years of age, who began to complain of numbness in the back of her neck, with vertigo and an excessive attack of vomiting lasting two days. For three years nothing peculiar was noted, but it was then seen that she was acting in an unusual manner. The patient had been a skilled dressmaker, but now did inferior work, hung a printed certificate upside down, etc. She woke one morning complaining of hallucinations, acted strangely and toward night had a convulsion attended with unconsciousness. She was now confined to bed for a couple of weeks, seemed to age rapidly, had severe headaches and verbal amnesia. This suddenly increased with a couple of attacks of vertigo. Ophthalmoscopic examination showed

the absence of optic neuritis, but there was left lateral homonymous hemianopsia.

There was word-blindness without letter-blindness. Right-sided paralysis without anæsthesia appeared and progressed. Finally death occurred five years after the first symptoms. An autopsy showed a small, nodular, partly disintegrated mass about the size of a hickory-nut at about the posterior fourth of the third temporal convolution. The surface of the second, third, and fourth temporal convolutions in their posterior half was granular and somewhat disintegrated.

A hard, yellowish-brown tumor was found in the temporal lobe, mainly in the third and second temporal convolutions, almost entirely in the white matter of the third. Microscopically this was shown to be a glioma, and it almost certainly started in the third temporal convolution at the posterior extremity of the horizontal branch of the fissure of Sylvius.

In the discussion Wharton Sinkler described a somewhat similar case which came under his observation several years ago. The patient, a woman 65 years of age, had violent occipital pain, which was so severe as to require the free use of narcotics. With this there was complete left lateral hemianopsia. After two or three weeks the pain subsided and she apparently returned to her normal health, the hemianopsia still remaining. He then, by accident, discovered that she had, to a great extent, lost the power of naming objects. This was three or four years ago. She has since regained, to a certain extent, the ability to name objects, and appears to be in good health, with the exception of the hemianopsia.

Bernheim¹⁴_{Oct. 24} states that the sole, well-demonstrated, anatomical localization is that of the foot of the left frontal convolution. Localization of agraphia at the foot of the second left frontal is not sufficiently demonstrated. The first left temporal plays a rôle in the evocation of accoustic images; it does not represent a centre; it may be nothing but a passage for impressions going from the auditory centre to the centres of ideation. The inferior parietal lobule does not represent a centre; it may be nothing but a passage for impressions going from the visual centre to the ideational centres. Conductibility plays the greatest rôle in aphasia. The paths of conductibility may be organically affected by direct lesion or, dynamically, by lesions of the neighborhood, cerebral shock, or senile enfeeblement.

Herzen¹⁹⁷_{Nov. 20, 1886} remarks on the scarcity of published cases of congenital aphasia, and records an instance in a Jewish boy, aged 5, whose parents and four brothers and sisters were healthy.

His birth had been normal and he had never had any infectious complaint. If such a condition is found in a child under 3, especially if rickety or hydrocephalic, it may be due to a simple retardation of development; if the age be more than 3 the prognosis must be very guarded. Herzen calls attention to the analogy between congenital aphasia and acquired aphemia (motor aphasia) in adults. Broca's description of the latter would do for the former, but, while the latter is due to a loss of "word-pictures" or forgetfulness of the process required for articulation, the former must be caused by a congenital malformation or arrest of development of the speech-centre, which must be bilateral, for otherwise in a child the right centre would quickly take the place of the left.

Motor Aphasia.—Prevost,¹⁹⁷ June, 76, Oct. 1 describes a case of Jacksonian epilepsy accompanied by motor aphasia, but without agraphia. The patient could always read and write except after one or two major epileptic attacks. There is, he thinks, too great a tendency to regard language as a special and isolated phenomenon among the manifestations of the nervous centres, and the development of an automatic act such as writing may be simply controlled by a special adaptation of conducting fibres uniting the different sensorial centres. A study of aphasia in violinists, pianists, typewriters, and others trained to express their ideas by automatic means involving more highly specialized action than writing may help to elucidate the true theory of this subject.

Dörrenburg⁴ Nov. 14, 76 describes the case of a young man, 18 years of age, who fell over the root of a tree, but was able to get up without assistance. At first he was entirely unable to speak, then stammered in an unintelligible manner. There was no loss of consciousness nor notable hæmorrhage. When seen by the author next morning his speech was still incomprehensible. Motility and sensibility were normal. There was a contused wound, forming a hole, in the left side of the skull, nine centimetres from the horizontal circumference, passing by the superior border of the auditory meatus and the supra-orbital margins and seven centimetres from the sagittal suture, in a perpendicular direction one and one-half centimetres in front of the left auditory canal. An almost spherical fragment of the cranial vault as large as a quarter-dollar was completely separated and pressed down—together with the intact dura mater, which adhered to it—one centimetre into the cavity. As soon as this fragment was removed speech became normal; when it was pushed down farther the aphasia became absolute. During its removal, if the patient began a sentence, he ceased abruptly in the midst of a syllable if

the piece were depressed. While the motor aphasia was complete, he responded accurately by writing to questions.

A study of aphasia in persons knowing several languages is presented by A. Pitres, of Bordeaux, ⁹²_{Nov. 10, '96} who states that it would seem natural that subjects of this kind should lose the use of all languages when stricken with aphasia, and recover them simultaneously as they recover from the affection. In a certain number of cases this is true, but not invariably so, for certain patients lose only some of the languages familiar to them; or, when they have lost all in the beginning, gradually become capable, first, of using one of them to the exclusion of the others, then of using all, or sometimes only some of them. Usually the aphasia, after being general at first, progressively diminishes, the patients beginning to understand and then to speak the tongue most familiar to them, finally beginning to understand and then to speak the other tongues which they knew. This systematic return occurs in cases in which the centres of speech—shocked, but not destroyed, by the cerebral lesions which caused the aphasia—gradually resume their functional activity. Their temporary inertia easily explains the sequence of the phenomena observed in polyglottic subjects, without invoking the absolutely hypothetical existence of new centres for each language successfully learned.

Mixed Aphasia.—Thomas and J. C. Roux, ¹⁴_{July 10, '96} observed 17 cases of aphasia, only 4 of which could recognize words when the letters were presented separately, and, of these 4, 2 only could read every word, the other 2 being able only to read words of one or at least two syllables. A second series of experiments was made by changing the appearance of the word and separating it into syllables or letters, the results leading the authors to conclude that in cortical motor aphasia the patient recovers the faculty of reading gradually in the following order: (1) the appearance of the word, (2) the association of syllables composing it, and (3) the association of letters forming each syllable; the synthesis of the word. This is the exact reverse of the act of learning to read in the child.

In the discussion Dejerine stated that the disturbances in the faculty of reading observed by him, in fifteen cases of cortical motor aphasia, due to destruction of Broca's convolution, corresponded exactly to the description of them given by Trousseau. These patients read as badly as they write, and it is incorrect to maintain, as do some authors, that they preserve the ability to read mentally. In reality they do not understand what they read. This alexia may persist for a long time, and, until the motor aphasia has disappeared, the abolition of mental reading is complete. Dejerine believes that, in lesions distinctly localized in

Broca's convolution, the centre of articulate speech, similar modifications of the functions of Wernicke's centre (auditory image) and the angular gyrus (visual image), can be explained by the fact that the three centres, though apparently independent and autonomous, are, in reality, closely related, both anatomically and physiologically; so that lesions of any one of them act reflexly on the others.

Lannois, of Lyons, ¹⁴_{Sept. 1, '96} describes the case of a woman of 32 years, who contracted syphilis from nursing a child, and soon after presented grave cerebral symptoms,—apoplexy, right hemiplegia, motor aphasia, and marked word-blindness, without blindness for letters or objects. Examination of the visual field never showed any contraction or hemianopsia. This is a new feature, he states, since the co-existence of ocular disturbances has been noted in every case up to the present time.

Alexia.—Ch. Nicolle and A. Halipré ¹¹⁵⁸_{Apr. 30, '96} observed a case of word-blindness with right hemiplegia which presented the symptom of mirror-writing. According to these authors, there exists in the right hemisphere (as proved by the mirror-writing in this case), as well as in the left hemisphere, a functional grouping of cells corresponding to the movements of the hand in writing. This centre, developed under the control of vision, remains latent in the right hemisphere, but may be suddenly aroused to activity when, under certain pathological conditions, it is no longer interfered with by the influence of the corresponding centre of the left hemisphere,—a centre more perfected in function and having in consequence a tendency to act in the place of the other. The automatic centre of *agraphia* develops late and remains intimately connected with the other centres of speech.

E. Redlich, of Vienna, ³⁹⁵_{Jan. 12, 1896} reports a case of the so-called subcortical alexia,—a variety of aphasia described by Wernicke under the name of "alexia" and by Dejerine under that of "pure word-blindness," and consisting of an inability to read, while the faculty of writing remains intact. The special interest of the case consists in the minute anatomical examination made, the autopsy showing a generalized atrophy of the brain. There were small and unimportant foci in the right occipital lobe and an extensive area of softening in the left occipital lobe, involving a great portion of the calcarine fissure, the lingual and fusiform lobes. There were also changes in Ammon's horns, and in the uncinate convolution. The softening was not limited to the cortex, but also involved the white substance, the posterior extremity of the corpus callosum, the posterior part of the optic thalamus, and extremity of the caudal nucleus. The convexity of the occipital lobe and

that of the temporal were intact. The softened area was dependent on, but did not affect the entire domain of the posterior cerebral artery, since the cuneus was not involved. It was evident that obliteration not of the principal trunk of the artery, but of one of its most important branches, had occurred. Upon microscopical examination the softening and secondary degeneration were found to be so blended together that it was impossible to distinguish them. The forceps minor was completely destroyed, and the larger part of the optic sheath softened and the seat of secondary degeneration. The forceps major was intact in the external superior portion and completely degenerated in the median portion. The inferior longitudinal fascicle was also softened posteriorly and almost completely degenerated. The posterior extremity of the corpus callosum was partly softened, as were some parts of the tapetum. The convex portion of the occipital lobe was found free from disease, even on microscopical examination. Ammon's was not softened in the anterior portions, but showed atrophy of the fasciculi. The left fornix revealed signs of degeneration.

A case of word-blindness recorded by Hinshelwood⁶ Dec. 21, '96 is of considerable interest, and an additional form of visual defect must be accepted in which, as in a few other recorded cases, there is not only word-blindness, or loss of memory of the signification of the words of a sentence, but a failure to recognize the individual letters of which words are composed. In this instance the precision of the limits of the cerebral lesion was so exact that Arabic figures were read with perfect ease though the patient was unable to name a single English or Gothic letter. The defect proving persistent, the patient, a man aged 58 years, was recommended by Hinshelwood to begin to learn his letters like a child, and, after some months of painful application, he recovered the power of naming them. There was complete loss of vision in the inner part of the right and the outer part of the left retina, or right lateral homonymous hemianopsia.

Toxic Aphasia.—Dupré, of Bordeaux,²⁰⁷⁵ ⁶ Nov. 10, '94 reports two instances of aphasia occurring during attacks of uræmia. Aphasic attacks due to toxic influences are already known to the profession in connection with the ingestion of tobacco and santonine. That the same trouble may be induced by the circulation in the blood of uneliminated toxins is shown by two cases cited by Dupré. A child, aged 9 years, was admitted into the Trousseau Hospital suffering from anasarca following scarlet fever. Six days later, when the condition due to the nephritis had greatly improved, anuria lasting twenty-four hours supervened, followed immedi-

ately by complete motor aphasia, with incomplete agraphia and paresis of the right upper limb without sensorial aphasia. This condition persisted for two days, and disappeared in a few hours after the flow of urine had become restored. Again, an old atheromatous, emphysematous, and bronchiectasic man, with contracted kidneys, was seized with influenza. A well-marked attack of uræmia appeared as a complication, and, with it, motor aphasia and partial agraphia without paralysis of the limbs. As in the first-mentioned instance, the aphasia was only of an ephemeral character, ceasing after a duration of thirty-six hours. In these patients, both of whom completely recovered, there remains no trace of the passing aphasia. Only a few examples of this complication of uræmic poisoning have been recorded (three by Raymond, one by Jocks, and one or two in L. Monod's thesis, 1868).

Amusia.—Edgren, of Stockholm, ⁸⁷⁰ May, June, '94; Dec. 22 ⁶ gives an extensive review of what has been published on this curious subject, including, in all, fifty-three cases. The author's conclusions are as follow: 1. Through various pathological processes the musical capacity, as well as the power of speech, can be destroyed wholly or partially, in the latter case being decomposed into its several components, thus making several varieties of amusia. 2. The various forms of amusia possess a certain degree of independence both as regards each other and in relation to aphasia. 3. The clinical varieties of amusia appear to be analogous to the clinical forms of aphasia; they are often, but not necessarily, combined with the analogous forms of aphasia. 4. Amusia may occur without aphasia and *vice versa*. 5. It is probable that particular clinical varieties of amusia also possess an anatomical independence; that they may be localized to neighboring, but not to the identical parts, where the analogous forms of aphasia are believed to be localized. 6. It is probable that a special form of amusia (tone-deafness) may be localized in the left temporal lobe in the first and second gyri, in front of the place the destruction of which causes word-deafness.

Dysphemia (Stammering).—From researches made on fifty patients affected with stammering, Gutzmann ⁶⁵⁰ Nov. 22, 24, '95 ascertained that psychological influences—as attention, reflection, etc.—are sufficient to modify respiratory rhythm and to cause irregular contractions of the diaphragm, even outside of speech. These irregularities are due to clonic or tonic spasms, which are not always revealed by simple examination or palpation. The treatment of the stuttering causes them to disappear together with the troubles of articulation.

This subject is discussed from the neurological stand-point by

Coxwell.¹¹⁸⁷₇₄ ²_{Dec. 15, 74} After showing that the stammerer is never amnesic and that the trouble of utterance is aggravated by ill health, nervousness, etc., he states that the fault lies in a paralysis of some part of the articulatory or phonatory mechanism *plus* excessive activity or even spasm of other parts. It is different from affections, like writers' cramp, which are brought on by overuse of the organ; dysphemia does not result from overuse. Singing, from its rhythm and continuous flow, is easier to the stammerer than ordinary speech, which changes rapidly in time and rate of flow. The author locates it in Broca's centre, and postulates two conditions to explain it,—namely, (1) a want of power (paresis) in some of the articulatory nerve-mechanisms of that centre, and (2) a want of accurate regulation of that centre owing to defective control of it by higher centres. Hence the treatment is twofold,—namely, generally tonic and specially gymnastic. Generally tonic: Regulated out-door exercise, shower-baths, and nerve-tonics (quinine, strychnine, or phosphorus). Vocal gymnastic: Daily practice in uttering the simple vowel-sounds, at first slowly and then more rapidly, and after good proficiency is attained to add consonants. The patient should next practice reading aloud daily, mastering every difficulty only by slow and assiduous practice. Simple narrative reading should precede dialogue. Patience and steady practice (including vocal or singing exercises) should be combined, but always stopping short of actual fatigue. The author states that he has cured many in this way, the treatment taking several months.

Amnesia.—Ferari.⁵⁹¹_{Nov. 24, 74} describes a case of partial continued amnesia, apparently due to a disturbance of the circulation in the cortex, in a man, 28 years of age, suffering from bilateral arcus senilis, sinuous and dilated arteries. He was a son and brother of arterio-sclerotic individuals, and several of his paternal and maternal ancestors died of cerebral apoplexy.

According to Egio Sciamanna,⁵⁹¹_{Nov. 11, 74} there is a form of amnesia originating during febrile infectious diseases and retrograde and progressive in character. It is also continuous and due not only to a disturbance of the faculty of evocation, but also to that of the conservation of images. It is accompanied by fixed subsentient ideas with obsession and a feeling of anxiety. It is in no way related to hysteria, alcoholism, or traumatism.

Paralyses.

Infantile Cerebral Paralysis.—V. Muratoff,¹⁰⁰⁵_{July, 76} ²⁷⁸_{Oct.} after a study of several cases of cerebral diplegia (infantile), in two of which he had an autopsy, concludes as follows: 1. In spite of the

similarity of the clinical symptoms, the pathology of the diplegic paralysis may vary greatly. 2. The congenital form (Little's disease) is connected with meningeal hæmorrhage and consecutive atrophy of the central convolutions. The secondary alterations of the pyramidal tracts are, from the study of the single case, to be considered as simple atrophy dependent upon disorders of development. 3. In the hereditary form secondary degeneration, with all signs of a destructive process, is met with. 4. While the clinical observation of Freud is important and instructive, a further analysis of the various forms on a pathologico-physiological basis is still needful.

In a critical review of Freud's paper, bearing upon the symptomatic resemblance of cerebral diplegia, insular sclerosis, and Friedreich's disease in children, Koenig, ^{Aug. 19, '96} who has contributed much to the literature of this subject, agrees that the diagnostic difficulties are sometimes very great in such cases.

Cerebral diplegia may, in some cases, be due to a bilateral meningeal hæmorrhage occurring at birth when delivery is protracted. Such an explanation would account for the imbecility, the muscular weakness, and the spasmodic movements present in a case seen by him, though with less certainty for the disturbance in speech. Disease of the posterior columns of the cord has not yet been noted in cases of infantile cerebral paralysis. Hæmorrhage might occur at birth over the cerebellum as well as over the cerebral hemispheres. In Huppert's case of congenitally small cerebellum difficulty in maintaining the equilibrium of the body had been noted during life. On the other hand, Koenig narrates a case of his own where a girl with typical congenital diplegia died of general tuberculosis at the age of 10; in her case the cerebellum was found to have attained only one-third of what should be the normal weight, though during life disturbance in co-ordination had never been noticed. Koenig thinks that the anatomical basis of cerebral diplegia is probably very different in different children, and that during life it is not to be determined with exactitude.

Oppenheim ^{Aug. 24, '96} expresses the same view, that these cases are sometimes due to bilateral lesions of the motor zone. In support of this belief he presented to the Berlin Medical Society two patients—a woman, aged 31 years, and her daughter, aged 10—both of whom illustrated, in his opinion, this theory. Both suffered from spasmodic cerebral diplegia. The mother had, from infancy, showed motor disturbances of the muscles of the trunk, limbs, tongue, vault of the palate, and pharynx, the most marked at present being of the cranial-nerve muscles. Although

the patient is intelligent and hears everything, she is unable to utter a sound, owing to spasmodic contraction of the lips and jaws, though the electrical excitability of the muscles of the lips and tongue is preserved. Deglutition is effected slowly, as are the movements of the hands. The same symptoms, though less marked, may be observed in the daughter, who is hardly able to speak, and then but unintelligibly, as do patients affected with bulbar paralysis. Ordinarily in such patients meningeal hæmorrhage or meningo-encephalitis gives rise to functional disturbance of the corresponding regions of the brain.

Theodore Diller, of Pittsburgh, ¹⁶¹_{Apr. 18, '96} makes a report of 6 cases of cerebral palsy in childhood. All these cases, except in birth-palsies, began with convulsions immediately followed by hemiplegia. In only 2 of these cases was there any mental or moral deterioration; paralysis was present in 6 cases; athetosis was present in 5 cases; aphasia in 1.

The extraordinarily large proportion of this series of six cases presenting athetosis and the equally small proportion showing mental deterioration are worthy of comment. A reversal of the proportions would be much more nearly in accord with average experience.

Leblais ²⁰⁰_{76, Apr. 20} publishes the results of a series of observations made by him in Bourneville's clinic with regard to certain trophic changes associated with infantile spasmodic hemiplegia, which indicate that these changes are only to be noted at puberty. Differences in the size of the testicle were noted in 8 out of 29 boys examined. In 7 of these the testicle on the hemiplegic side was smaller than on the sound side; in 1 it was larger. Retention of the testicle in the inguinal canal seemed to be more common than among normal children. Among the girls the only abnormality noticed at puberty was that in 1 case the mamma on the paralyzed side was hypertrophied. As a rule, the hair developed at puberty less well on the paralyzed side, but sometimes the opposite was the case; in others the development took place unequally, but the inequality was not symmetrical; in others, again, development of hair was normal on the two sides. Puberty developed in the hemiplegic children at the same age and with the same phenomena as in healthy children.

Lannois and Pauly ²¹¹_{Dec. 22, '96} report a patient who, at the age of 2 years, had hemiplegia or, rather, hemiparesis, with a slight arrest in development of the limbs of the left side. At 56 years of age he had another attack, the hemiplegia being complete and accompanied by progressive contractures. There was a history of epileptic crises occurring after puberty only, and but rarely, and

ceasing at 40 years. The memory was good and the intelligence mediocre. The patient died of tuberculosis.

Under the title "Painful Paralysis in Infants," Brunon¹¹⁵³
June 29, '96 reports eight cases in which, following slight traumatism, there resulted a transient uselessness of a limb associated with much pain on induced movements. As recovery occurred in all cases in from one to seven days, the term "paralysis" would seem to be a misnomer in its application to such conditions.

Koenig, of Dalldorf,⁴
No. 22, '96 describes a transitory hemianopsia and concentric limitation of the field of vision in a case of infantile cerebral paralysis.

A case of infantile eclampsia with right hemiplegia, followed by left hemiplegia and rapid recovery, is recorded by Frank Woodbury, of Philadelphia.⁹
Apr. 27, '96

Hemiplegia.—An investigation of 30 cases of hemiplegia made by Grawitz¹¹⁴
B. 26, H. 1, June, '96 showed that in 7 only was there no respiratory difficulty, and it is noteworthy that, of these 7, 6 were females, and in all 7 recovery was relatively rapid and complete. The respiratory disturbances accompanying hemiplegia are variable. In 2 cases typical Cheyne-Stokes respiration was present; in 2 others there was very marked diminution of respiratory movement and capacity on the paralyzed side. This diminution was noticeable, not alone on forced respiratory movements, but during tranquil breathing. This diminution seemed to consist, in some cases, of a retardation of the beginning of inspiration and a premature cessation of expiration. In one case of left-sided hemiplegia there existed a limitation of respiratory movement on the opposite side of the thorax; that is, the respiratory movement was much more energetic on the left side than on the right. It is very remarkable that the paralysis of respiration disappears several weeks or months after the paralysis of the members. It would seem probable, therefore, that the cerebrum exercises the same action on unconscious respiration. The duration of these complications is too long to have them be attributable to an exertion on the respiratory centres by cerebral arrest.

Hemiplegia as a result of gonorrhœa is discussed by L. Bruns, of Hanover,⁷⁵
No. 1, Jan. 11, '96 who describes the case of a young woman, aged 20, who immediately after her marriage became infected with gonorrhœa, which, in spite of treatment, caused perimetritis and salpingitis. Soon after this, and without warning, she was suddenly attacked with convulsions in the right side of the face and tongue and in the right upper limb, especially the hand. The leg at this time was apparently not affected. These attacks were repeated, and during the attacks and for a little time

after them there was aphasia. There was paresis of the right face and of the right arm, and the right leg later became similarly affected; so that when she was seen by Bruns there were right-sided hemiplegia, complete motor aphasia, and slight blunting of sensibility. There was no headache or vomiting, and the ocular fundi were normal. There was no hemianopsia, the heart was sound, and there was no sugar or albumin in the urine. After this there was gradual improvement, especially in regard to speech, but the motor affection of the limbs still remained distinct and considerable.

Massalongo and Bonatelli ⁶⁸_{Aug., Sept., '96} observed a case of pneumonic hemiplegia, and Neurath ¹¹⁸_{Jan., '96} a case of cerebral hemiplegia following whooping-cough.

T. Cohn ⁴_{No. 10, '96}; ²_{June 16} showed a case of intention-tremor in infantile hemiplegia in a female patient aged 25. At the age of 1½ years she had a right-sided convulsive attack, lasting between three and four hours, and followed by right hemiplegia. Before the age of 9 years she had two or three similar attacks, but after that age they did not recur. No abnormal movements are observed, except when voluntary movements are being executed by the right upper limb; then a nearly rhythmical "intention-tremor" is observed in the limb, increasing as the object of the movement is approached. A few irregular, intermediate movements of the limb indicate, perhaps, the presence of some ataxy. Shutting the eyes makes no difference. Some motor paresis in the right lower limb. Tendon reflexes active on both sides. Sensation normal. Cohn remarks that cases are rare in which an "intention-tremor" takes the place of the ordinary post-hemiplegic chorea, or athetosis. He has found only eight cases recorded. In the cases in which a post-mortem examination has taken place there has generally been found a lesion (softening, hæmorrhage, or tumor) in the posterior limb of the internal capsule or in the adjoining parts of the optic thalamus or corpus striatum.

The knee-reflex in hemiplegia has been studied by Féré, ¹⁴_{Mar., '96} who finds that shock of the reflex on the diseased side causes a sudden cry, while on the healthy side no such cry is to be noted. The same author ⁵⁵_{June 1, '96} has found that diminution of the size of the diaphragmatic wave of Litten, on the paralyzed side, is especially marked in infantile hemiplegia.

Thomas M. Dunn, of West Chester, ¹¹²_{May, '96} describes a case of double hemiplegia, with double hemianopsia and loss of geographical sense.

H. Reynès ¹⁰⁰_{No. 27, '96} observed a case of hemianæsthesia and crossed hemiparaplegia (syndroma of Brown-Séguard) following medullary commotion from being thrown to the ground on the back.

Bulbar Paralyses.—Remak⁴_{No. 3, '96},²⁴²_{Dec.} reports the case of a woman, 21 years old, of healthy parentage, in whom there existed amyotrophic lateral sclerosis with involvement of and paralysis in the upper seventh nerve distribution. This is in contrast to the widespread opinion, and, it may be said, to the rule, that the upper facial innervation is never affected in progressive amyotrophic bulbar paralysis. Remak says that his case demonstrates also that the therapeutic efficacy of electricity cannot be relegated to mental influence or suggestion. Daily galvanization of the swallowing muscles was instituted, an anode of 30 cubic centimetres applied directly beneath the border of the occiput, a cathode of 15 cubic centimetres close to the pomum Adami, and with a current of from 3 to 6 milliampères, stable application. The patient had been reduced to a very ill-nourished condition on account of the inability to swallow. After a few days the beneficial effects of the electrical treatment were to be seen, and it was not long before the patient could eat and swallow with some degree of comfort. This increased capacity to take food was followed by an increase of bodily weight and a general bettering of nutrition, which continued for several months, when the progressiveness of the disease once more assumed the ascendancy.

J. B. Charcot and G. Marinesco¹⁴_{Feb. 27, '96} report an instance of subacute bulbar paralysis of the descending type. There was complete external ophthalmoplegia, complete paralysis of the lower limbs, incomplete paralysis of the arms, trunk, and face in a boy of 13 years, who died within three months. There was no atrophy and no disturbance of electrical reaction not dependent on a degenerative lesion of the centres of the affected muscles. The authors admit, in this case, an abolition of the motor function of the cell, with preservation of the trophic function.

Two cases which have come under the notice of J. P. Tildesley, of Willenhall, Eng.,⁶_{Nov. 22, '96} are worthy of record on account both of the fact that few uncomplicated cases have hitherto been recorded and also of certain instructive symptoms and pathological conditions which were observed. The patients were seen in private practice; so that it was possible to obtain a post-mortem examination in only one instance. In these cases, as contrasted with the much more frequent form of progressive paralysis which is due to "pigmental atrophy of the large cells contained in the nerve-nuclei of the medulla, associated with circumambient sclerosis," the points of interest were: 1. The suddenness of the attack. 2. The accompanying paralysis of the limbs, due to the lesions not being limited to the motor-nerve nuclei. 3. That hæmorrhage, although infrequent in the medulla, appears to be

the most common cause of acute bulbar paralysis. 4. That the lesion is more frequent in the lower half of the medulla, affecting primarily the nuclei of the hypoglossal nerve and thus occasioning the difficulty of articulating the linguals, the hypoglossal being the motor nerve to the extrinsic muscles of the tongue and the depressors of the hyoid bone. 5. That the vagus and spinal accessory nuclei are necessarily implicated, the nucleus of the latter nerve being a continuation downward of that of the former; thus are explained the bronchial expiration and weakened phonation from want of innervation of the muscle of Reissen and the muscles of the larynx. Vomiting, dysphagia, intermittent pulse, glycosuria, and diabetes may also be met with as results of damage to the centres. 6. The motor paralysis of the palate and uvula is accounted for by the fact that the cells of origin of the motor branch of the fifth nerve descend in the medulla as low as the tubercle of Rolando and are necessarily damaged. 7. A fact noted by Duchenne which he observed in the latter of the two cases described above,—viz., that when the tongue was raised with the fingers the patient could depress it forcibly, thus proving that the “depressors of the tongue were not all paralyzed.”

Microgyria and the infantile form of central bulbar paralysis form the subject of a paper by Oppenheim, of Berlin,⁵⁴ in connection with a case in which, at the autopsy, the most striking appearances were observed in the brain. On the left side was a combination of porencephaly and microgyria; these appearances were specially striking in the central convolutions. The character of the gyri was also altered, showing marked foldings and being curled as if covered with numerous fine markings. This microgyria was also present in the posterior section of the third frontal convolution. There was also a diminution of the medullary substance, atrophy of the corpus callosum, pons, and cerebral ganglia. In the spinal cord there was also atrophy of the lateral columns. No other changes could be observed macroscopically. Microscopically remarkable changes were found in the cells. The pyramidal cells were absent altogether, and in their place were small round cells. The spinal cord showed the greatest changes. The intra-cortical substance was also changed,—two gyri were grown together.

Asthenic Bulbar Paralysis.—Collins⁴⁵¹ publishes a clinical lecture upon asthenic bulbar paralysis,—myasthenia gravis pseudo-paralytica (Jolly). Wilks, Erb and Oppenheim, and others who have written upon the subject are freely quoted. Collins's patient, a woman of German birth, 27 years old, married and the mother of two children, manifested the first symptoms when

about six months pregnant with her second child, or some three years previous to the report of the case. Following an indefinite feeling of easily-induced fatigue and rapid exhaustion, particularly in speech and swallowing mechanism, as well as in the extremities, there developed a ptosis, first on one side and then on the other, associated with diplopia (third and perhaps sixth nerve). Then occurred weakness of muscles of mastication (motor fifth), defect in articulation and vocalization (ninth and tenth), unwieldiness and sluggishness of the tongue (twelfth), attacks of distressing tachycardia and paroxysmal dyspnoea, and weakness and feeling of exhaustion in the trunk and extremities,—a true amyasthenia of all the motor parts of the body. The strictness with which the symptoms were confined to the motor sphere in this case was most striking,—a fact noted in all others reported. Symptoms characteristic of true degenerative bulbar paralysis which were absent in this case and others of this type were drooling of saliva, atrophy of the muscles, fibrillary twittings, lost deep reflexes, and lost electrical irritability.

Strümpell¹⁰⁰⁵_{V. 2, No. 1, 2} also makes a contribution to this subject, including a *résumé* of the literature. The case which he describes makes twenty-one now on record. The age of onset is usually in young adult life, under 30, with a slight preference for females. It may develop quite suddenly, although it is usually of gradual onset; occasionally, there is at first pain (never violent) or a mild vertigo. The symptom-picture is much as described by Collins. It is exclusively an affection of the motor system. Relapses are said to be common even a year or two after apparent recovery. Menstruation always temporarily aggravates the symptoms. The prognosis is always doubtful. Pathologically, no microscopical changes have been found, nor are they to be expected. Strümpell is disposed to accept the theory of intoxication, though whether it be *auto* or *extra* he cannot say.

Pseudobulbar Paralysis.—Sacaze, of Montpellier, records the case of a patient who, in consequence of two separate attacks, suffered from left hemiplegia, hemichorea, aphasia, and aphonia, with great difficulty in swallowing, and paresis of the tongue and of the soft palate. The necropsy revealed areas of softening in both hemispheres, the internal capsule, the lenticular nuclei, and the caudate nuclei being destroyed on both sides. The pons and medulla, apart from commencing secondary degeneration of the pyramids, were quite normal. This case illustrates the fact, which has now frequently been pointed out, especially by Barlow and Hughlings-Jackson and James Taylor in England,⁶_{Feb. 10, '96} that a lesion on each side of the cerebrum gives rise to symptoms which

so closely resemble those of bulbar paralysis as to be clinically almost indistinguishable from these. The reason of this seems to be that, whereas a unilateral lesion in the brain gives rise to only transitory and slight affection of the bilaterally associated movements, the occurrence of a second lesion on the opposite side of the brain so weakens those movements as to cause very distinct impairment of the œsophageal, laryngeal, palatal, and tongue movements, thus giving rise to symptoms which closely simulate those of bulbar paralysis.

Newton Pitt²¹⁵⁴ gives full clinical and pathological details of a striking case of this interesting form of disease. The patient, when first seen, was a man, aged 51, who at Christmas, 1892, had an attack of slight right-sided weakness without aphasia. The face was markedly affected and inability to close the right eye persisted. Two months later he had an attack in which numbness about the left hand and the left side of the face was noticed. He was also speechless, but in the course of a few hours his speech returned and was again lost, and it returned and was lost several times in the course of a few hours. It finally was lost and remained permanently in abeyance. He was first seen about sixty hours after the attack; then his face was expressionless, he was unable to raise or move his lips, and he could not close the eyelids tightly, although they were closed during sleep. He was unable to protrude his tongue or swallow anything. His limbs were weak on both sides, but the knee-jerks were brisk, that on the left side being the greater. There was no impairment of sensibility and no wasting or fibrillary twitching in the tongue or other muscles. The urine contained albumin. The patient was carefully fed with the tube and gradually improved so that he was able to return home, taking a tube with him. After six months, however, he was re-admitted, suffering from ascites, and died soon afterward. At the necropsy two patches of softening were found,—one on the right side, extending above the lenticular nucleus, and below, lying on its inner and posterior part, extending into the middle of the posterior limb of the internal capsule; the other on the left side, occupying the middle of the posterior limb of the internal capsule, and below extending into the posterior part of the lenticular nucleus. The cerebral arteries were distinctly atheromatous.

Lesions.

Cerebral Hæmorrhage.—C. L. Dana, of New York, presented to the American Neurological Association, Jan. 1, 1896, a paper and a report of 100 consecutive cases of apoplexy with hemiplegia observed at

his clinic at the Post-Graduate Hospital; also 79 cases of apoplexy with autopsy observed in Bellevue Hospital. Thirty of the latter had come under his personal care and observation. Of 100 non-fatal cases 36 had been due to syphilis, the special characteristics of these being that they occurred in early life, were often multiple in character, and that the pathological condition underlying them was usually a thrombosis and softening.

So far as his experience and records went, cerebral hæmorrhages were rarely repeated, and it seemed as if in many cases the rupture of an artery had changed the vital conditions, as it certainly did the personal habits; so that the attack exercised a conservative influence upon the individual and actually tended to prolong life.

E. D. Fisher, of New York, read a report of 77 cases. Fifty-one patients had had one attack, 16 had had two attacks, 9 had had three, and 1 had had six. All were still living. These cases had been observed in his service in the City Almshouse. The average age at which the first attack had occurred was about forty-five years. His observations, he thought, confirmed what had been said by the previous reader. The longest duration since the attack had been twenty-two years.

T. M. Rotch and A. H. Wentworth, of Boston, ⁸⁹_{Aug. 15, '96} describe the case of a female infant, 5 days old, said to have been premature at 8 months. Vomiting occurred a few hours after entrance to hospital, and persisted at intervals until the infant's death, which occurred about twenty-four hours later, no definite diagnosis having been made. There were no convulsions at any time, and no other symptoms than collapse, stupor, and vomiting. The temperature remained subnormal, and the respiration just before death became slow and irregular. On the under surface of the cerebellum and pons there was considerable clotted blood. The right lateral ventricle and third and fourth ventricles were filled with freshly coagulated blood, and the choroid plexus was involved in the middle of the clot. There was no pigmentation of the brain-substance, and no evidence of trauma on the scalp or skull. The case is of interest from the absence of marked cerebral symptoms. That such an extensive hæmorrhage into the brain could occur without convulsions or even unconsciousness in a child appears remarkable.

R. D. Bibber, of Bath, ⁸⁹_{Aug. 22, '96} reported to the Maine Medical Association a case of apoplexy, interesting in character from the fact that, at intervals of a few hours during the first day or two, consciousness was regained and entire use of the paralyzed left side of the face, left arm, and leg for periods of five or ten minutes

at a time. Recovery took place without unusual symptoms, and the patient died a year later from another stroke.

Elder showed to the Edinburgh Medical Society ³⁶_{Sept., '96} a brain with hæmorrhage into Broca's convolution and the part between Broca and the internal capsule. The peculiar interest of this specimen was that the part of Broca involved was the posterior part, and he had found, on looking up the record, that there were very few cases where such a specimen had been produced, very few cases where the posterior part of Broca alone was involved in hæmorrhage or obstructive lesion. The symptoms were almost those of bulbar paralysis. The paralysis was on the right side of the face and almost entirely limited to the lower part, the part around the eye not being involved. There was paresis or paralysis of the muscles of the lips or the angle of the mouth, also paresis of the muscles of the tongue and throat and those involved in swallowing. There was no paralysis of the leg or arm. The only other symptom was dilatation of the right pupil, and this came on toward the end of the case; it was not seen at the beginning.

In a case of cortical hæmorrhage with rupture into a lateral ventricle, seen by H. A. Royster, of Raleigh, N. C., ⁵⁹_{Dec. 7, '96} the autopsy, by J. W. Boyce, revealed an extensive cortical hæmorrhage on the left side, involving the leg- and arm- centres, with rupture downward into the left lateral ventricle. The ventricle itself was filled with clots, and there were points of minute hæmorrhages in its walls.

The case was somewhat peculiar in the existence of two rather unusual symptomatic conditions,—that of a persistently *lower* ($1\frac{2}{10}^{\circ}$) temperature on the paralyzed side and conjugate deviation of the head and eyes toward the paralyzed side rather than toward the lesion.

A third observation of interest was the rigidity of the arm on the paralyzed side. The true meaning of this condition did not suggest itself during the investigation of the case, and it was not until afterward, while studying the subject, that the author's attention was called to it. Strümpell ²¹¹⁶_{p. 729} says: "In contrast to the usual laxness of the arms and legs during the apoplectic coma is the tonic rigidity sometimes seen in the extremities, particularly on the opposite side to the hæmorrhage. This symptom seems to be especially, although not exclusively, connected with a bursting of the escaping blood into a lateral ventricle."

Primary ventricular hæmorrhage is rare and most frequently unilateral. Seppilli, ⁵⁰⁵_{Nov. 5, '96} however, has observed a case in which the hæmorrhage was bilateral. From the symptoms presented by

the patient the author concludes that after an apoplectic attack, with flaccid unilateral hemiplegia, if bilateral contraction of the extremities appear, lasting several days, with a deviation of the head and eyes to the hemiplegic side, a diagnosis of capsular hæmorrhage with secondary hæmorrhage of the ventricles may be made. A case of hæmorrhage into the pons simulating opium poisoning is described by F. W. Edridge-Green, of Hendon. ^{May 11, '96}

In a clinical lecture on the prognosis of apoplexy due to cerebral hæmorrhage, A. G. Barrs, of Leeds, ^{May 18, '96} states that there are, in his opinion, three important prognostic indications to be looked for in any given case of apoplexy due to hæmorrhage into the substance of the hemisphere,—namely: (1) renal disease, (2) Cheyne-Stokes respiration, and (3) hyperpyrexia. By far the most important of these is renal disease. In any case of apoplexy due to hæmorrhage into the hemisphere, if renal disease, Cheyne-Stokes respiration, or hyperpyrexia—any one, two, or all three—be present, the patient will, in all probability, not recover. If no one of these is present, and does not make its appearance, he may, and probably will, recover, however long insensibility may last and however deep it may be. The presence of other serious conditions, such as diabetes, chronic alcoholism, typhoid fever, idiopathic anæmia, will, no doubt—for he has seen examples to this effect—exert just as fatal an influence as renal disease upon the course of sanguineous apoplexy.

Preston, of Baltimore, ^{Feb. 2, '96} believes that in the treatment of apoplexy more might be done in the prodromal stage if this condition were more carefully studied and oftener recognized. There are no constant or certain prodromata, but in a considerable proportion of the cases related by him the history obtained afterward from the patients showed the existence of headache, vertigo, or a sense of fullness in the head, numbness of one side, etc. These symptoms in some instances existed for a week before the apoplectic attack. It is very important to heed these warnings, especially in cases where there is atheroma of the vessels or where there is high arterial tension without atheroma. Rest, vascular sedatives, nitroglycerin, and large enemata will often modify the force of the circulation and thus tend to avert the rupture of the artery. The ice-cap to the head is of some use in allaying restlessness. The use of ergot and that class of remedies is of more than doubtful propriety. Aconite may sometimes be used to advantage in controlling a too forcible heart's action. When the attack has taken place, and as soon as the patient can swallow, it is the author's custom to administer a mixture of bromide and iodide of potassium, 30 to 40 grains (1.95 to 2.60 grammes)

of the former and 10 grains (0.65 gramme) of the latter, and this is kept up for several days; then the bromide is omitted and the iodide used alone in increasing doses. In regard to the custom of administering croton-oil or some drastic purge during the early stage, although sanctioned by almost immemorial usage, it is not only useless, but exposes the patient to the risk of making dangerous exertions, besides putting him in a filthy condition. The same objections in part apply to blistering and to the use of mustard.

Cerebral Thrombosis.—In a clinical study of thrombosis of the basilar trunk and vertebral arteries, C. Hiesco, of Paris, ²⁰⁰⁰ collects 31 cases, 2 of which were hitherto unpublished. Syphilis is the most frequent cause of the affection, which leads to apoplectiform attacks, paralysis of the extremities and the cranial nerves, combined in various ways, according to the bulbar seat of the lesion. It is especially by the grouping and evolution of these symptoms that the diagnosis of thrombosis can be made. The author distinguishes four forms: the *foudroyante*, rapid hemiplegic, hemiplegic with prodromata, and hemiplegic complicated by other cerebral accidents.

In a case of thrombosis of the basilar artery due to arteriosclerosis, seen by Peabody, of New York, ⁵⁰ July 27, '98, the basilar and other arteries of the brain, particularly the small arteries, showed the lesions clearly. There was quiescent old tubercular infiltration of one apex, but no other lesion of chest or abdomen. A history of syphilis could not be obtained.

John F. Hilton, of Lewiston, ⁹⁹ Aug. 22, '98, urged the idea that emboli oftenest had their origin in thrombi, and that the distribution of the left common carotid was most frequently their seat from its direct anatomical relation to the current in the aorta.

Cerebral Phlebitis.—Phlebitis of the encephalic veins and the sinuses of the dura mater was seen by H. Claude, ¹¹⁸ July, '98. The presence of the pneumococcus in the blood-clot of the encephalic veins could not be absolutely confirmed by inoculation, but the morphological characteristics and culture of the diplococcus found in the clot, the presence of the same micro-organism, encapsulated and lanceolated, in sections of the veins, and its analogy with the diplococcus found in the lungs warrant the conclusion that it played a pathogenic rôle in the phlebitis. The pneumococcus has been often noted in meningitis, but not in encephalic phlebitis, the microbes so far met with in these cases being the streptococcus (Achard and Renault) and the bacterium coli (Girode).

In reporting a case of probable septic phlebitis of the left sigmoid sinus, Eskridge and Rogers, of Denver, ⁹ Oct. 1, '98, state that

the diagnosis of acute brain trouble following otorrhœa rests between infective thrombus, meningitis, and abscess of the brain. The clinical history of each of these morbid processes, when taken individually, is quite distinct, and the diagnosis is comparatively easy when the symptoms of one of these pathological states do not obscure or complicate those of the others. Unfortunately we may have two or all of these morbid processes existing at the same time in the same individual, when the symptoms of abscess may be totally obscured by those of meningitis or thrombosis. Meningitis is attended with a continual elevation of temperature considerably above normal, and usually also with symptoms of intra-cranial nerve-irritation, and not infrequently, further, with retraction of the head, while an infective condition of the sinus is marked by repeated chills followed by high temperature and well-pronounced febrile remissions. The pulse is rapid and weak, and tenderness is often present over the mastoid region and posterior upper cervical triangle of the neck and over the course of the jugular vein. The symptoms of an infective thrombosis are so obtrusive as in a great measure to overshadow those of abscess. The affection of the sinus demands the first attention, as a cure would be impossible, though the contents of the abscess were evacuated, so long as the condition of the sinus was allowed to go unrelieved; and the abscess should receive attention later, if it is possible to diagnosticate it. The presence of basilar meningitis of the posterior fossa is evidenced by retraction of the head, and of the middle fossa by involvement of the cranial nerves.

George Heaton ¹⁵_{Sept., '96} writes at some length upon the symptomatology and treatment of infective thrombosis of the cerebral sinuses. The paper contains a report of a case with the results of autopsy. The only plan of treatment believed by the author to afford any chance for the patient is a prompt opening and cleansing of the diseased sinus and the ligation of the internal jugular vein. This latter procedure is intended to arrest the progress of the thrombus along its most common course, and to prevent portions of the infective clot from being carried along into the general circulation. Böke ³²⁸_{B. 40, p. 36} exhibited before the Hungarian Otological Society pathological specimens from a fatal case of sinus phlebitis secondary to otitis.

Cerebral Traumatisms.—The subject of traumatic intra-cranial hæmorrhage, the result of violence or accident, is elaborately and quite comprehensively discussed in a paper in the *Boston Medical and Surgical Journal* for March 12, 1896. Keen, Taylor, Putnam, Laplace, Dercum, Sinkler, Elliot, Bradford, Weissman, Griffin, Krönlein, Thiersch, Scudder, and Lund are all quoted *in extenso*.

Weissman is reported as finding statistically a percentage of 89.1 mortality in non-operated cases, while in the cases operated upon it was only 32.7,—a most remarkable showing in favor of operation,—while Scudder and Lund, from an analysis of 45 cases, report 33 recoveries and 12 deaths from operation,—a mortality of 27 per cent. Thiersch, Warren, and Krönlein are quoted as advocating two, three, or several trephine-openings if the site of hæmorrhage is not found with the first operation.

A case of fractured base of skull with laceration of brain, accompanied by sugar and acetone in the urine, is reported by E. Bromet and J. G. Pardoe, of London. ⁶_{Sept. 21, '96} The left hemisphere of the brain had sustained most extensive injuries, and the right hemisphere also had not escaped, the lesions here being apparently due to *contrecoup*, the anterior extremity of the second right temporal convolution being much lacerated, the laceration extending from the surface into the fissure of Sylvius, in which there was a large clot.

A fatal case of cerebral traumatism with the anatomical lesions of acute hæmorrhagic inferior polioencephalitis is recorded by Sinkler. ¹⁰⁰⁵_{p. 465, '96}

Joseph Bell, of Glasgow, ³⁶_{Feb., '96} more than thirteen years ago published some cases in which, after recovery from cranial injuries, it was found that a period of time before the accident was absolutely forgotten,—retrograde amnesia. He now records ³⁶_{Nov., '96} an interesting example of the same character.

The diagnostic value of fluid discharges from the ear in head injuries is discussed by Alexander Miles, of Edinburgh, ³⁶_{Nov., '96} who states, after a series of carefully considered experiments, that the diagnosis of fracture of the middle fossa of the base of the skull is usually considered as beyond doubt when there is present, among other signs, a copious and long-continued bleeding from the ear, accompanied or followed by the escape of a greater or smaller quantity of cerebro-spinal fluid. The writer is inclined to doubt the soundness of this opinion, and submits various arguments in controversion of this doctrine.

Encephalitis.—Oppenheim, ³¹⁹_{Feb. 9, '96} ²_{Apr. 27} in discussing the subject of acute non-suppurative encephalitis, states that the separation of the non-suppurative from the suppurative disease is most important. The etiology of the hæmorrhagic form of the disease is not always the same. By some it has been attributed to alcohol, by others to influenza, and there are a number of cases of no known etiology. It begins with severe symptoms, but usually runs a favorable course. The author gives short details of five cases observed by him, all of which recovered. In none of these cases was

there any evidence of syphilis. In the literature of this disease the prognosis has not always been looked upon as very favorable, but in recent writings recoveries have been noted. Polioencephalitis must be distinguished from disseminated sclerosis, which not very rarely takes an acute form, and which, according to the author, may end in complete recovery. Acute course, rapid development, high temperature, etc., are unfavorable signs, whereas low temperature and a protracted course make the outlook favorable. In the discussion Fürbringer stated that he had observed 8 cases of acute encephalitis after influenza, 4 ending in recovery. Fränkel, Koester, and Treitel had also seen acute cases with recovery; so that the prognosis is not so grave as has been supposed.

Durante ¹⁴_{May 8, '96} describes a case of fatal encephalopathy following influenza. At the post-mortem examination macroscopical examination revealed thickening of the pia mater, both hemispheres being infiltrated with an abundant yellow fluid, especially in the sulci. Both sides were equally involved. In the right side was a hæmorrhagic area in the depth of the gray substance as large as a pea and softened in the middle. In the first occipital of the same side was another hæmorrhagic focus, also intra-cortical, but smaller. The ventricles, full of fluid, were dilated. On histological examination the pia mater was seen to be extensively infiltrated with small round cells and its vessels were greatly dilated. In the thickness of the gray matter the vessels were seen not to be intact. Bacteriological examination showed no microbe, not even that of influenza, though the author adds that the latter never penetrates into the blood. In the presence of the symptoms of depression, of the diffusion of the troubles, and the results of the autopsy, the case was diagnosed as one of meningitis. In the discussion Cornil stated that cases of suppuration consecutive to influenza must be according as bacteriological examination shows whether or not the microbe of influenza is associated with the ordinary microbes of suppuration. In this case the interesting point was the absence of all microbes. Besides, in suppuration due to the pneumococcus, there is a fibrinous exudate; in that due to the streptococcus or staphylococcus the pus is smooth; in this case, on the contrary, the pus was serous and fluid.

Boedeker ⁹⁴_{Dec., '96} describes a case of acute hæmorrhagic polioencephalitis due to alcohol. The hæmorrhagic process was seen at autopsy to be in relation to important changes in the vessel-walls, as thickening and calcareous infiltration. There were also areas of hyperæmia and thrombosis.

In a case of poliomesencephalitis Kalischer ⁴_{Nov. 10, '96} found that the lesions were most marked in the cervical enlargement and in

the region of the anterior oculo-motor nucleus.* The walls of the blood-vessels were not obviously altered. Kalischer remarks that the muscles were powerless for hours together, but at times the patient regained some power in them, though they soon became tired out and paralyzed again. This has been noticed in other recorded cases. He mentions similar cases in the literature where the necropsy yielded negative results. The terms "polioencephalitis superior" and "upper bulbar paralysis" he considers unsuitable, and he points out that, when the oculo-motor region is affected, the correct term should be "poliomesencephalitis"; the present case, he says, would therefore be one of "poliomesencephalomyelitis."

Freyhan⁸¹_{Nov. 18, '96} gives the history of a boy, 15 years of age, in whom he had observed two forms of hæmorrhagic encephalitis at the same time,—the type of acute hæmorrhagic superior polioencephalitis of Wernicke and the acute primary hæmorrhagic encephalitis of Strümpell-Leichtenstern.

Lead Encephalopathy.—In a rather large experience with lead poisoning, A. E. Roussel, of Philadelphia,⁶¹_{June 15, '96} has been able to confirm the views of previous writers, that, in a fair proportion of cases, many of the symptoms formerly attributed to the lead—such as anæsthesia, local hyperæsthesia, headache, etc.—may be more successfully treated by the bromides than the iodides. The view that hemianæsthesia is proof of the hysterical nature of the affection may also explain the relative frequency of cases of lead encephalopathy in recent literature, with a proportionate diminution in the mortality. Denarié, of St. Etienne,²²⁸_{Nov. 15, '96} observed a case of chronic lead poisoning with cerebral disturbance, terminating in suicide.

Miller and King⁵_{Feb., '96} report an interesting case of acute lead encephalopathy in a young woman engaged in carpet manufacturing, entrance of lead into the system occurring as a result of the handling of selvage of window-shades which had been colored with lead-paint. The primary evidences of lead poisoning in this case occurred in less than two months of the exposure, the symptoms being referable to the nervous system and the brain, more particularly *ab initio*. Optic neuritis was an early symptom, preceded, however, by headache, vertigo, obstinate vomiting, and convulsion, followed by total blindness lasting nearly two months. Under the usual treatment she made an excellent recovery.

Hydrocephalus.—Reiner, of Vienna,⁶⁵⁰_{Nov. 20, '96} gives the results of some researches made with Schnitzler on compression of the brain. Artificial extravasations were made to immediately, but temporarily, increase the flow of blood from the brain. When com-

pression ceases normal circulation is re-established. When artificial extravasation is produced, the blood-pressure increases in proportion to the pressure of the cerebro-spinal fluid. The prolongation of the blood-flow is due to an obstruction of the veins, and compression of the veins also diminishes the absorption of the cerebro-spinal fluid. It appears from these experiments that increase of the general pressure has not the same effect as increase of the local pressure, circulation in the brain being modified only by changes in local pressure. Conformably to these experiments, clinical observation shows that symptoms of cerebral compression are independent of the pressure of the cerebro-spinal fluid.

H. Botescu⁶⁸⁰_{No. 17, '94} describes a case of hydrocephalus from the service of Romniciano. The child was 7 months old and had an enormous hydrocephalus. The skull was twice tapped, 250 cubic centimetres (8 ounces) of fluid being removed at the first operation and 500 cubic centimetres (16 ounces) at the second. At the autopsy the brain was found to weigh 150 grammes (5 ounces). The adipose tissue was everywhere enormously developed; the cranial wall consisted of a thin, transparent, parchment-like membrane, with little islets of ossification scattered here and there.

A case of hydrocephalus, right hemiplegia, and sarcoma of the right parietal lobe is reported by Dinkler, of Heidelberg.¹⁰⁰⁵_{H. 4, '95}

Two cases of hydrocephalus, associated with complete absence of communication between the fourth ventricle and the sub-arachnoid space are recorded by Joseph O'Carroll, of Dublin.¹⁶_{Oct. 1, '94}

Tumors.

Tumors of the Frontal Lobes.—Aldibert⁹¹_{Feb., '95}⁸¹⁴_{Oct. 1} reports a case of cerebral tumor occurring in a woman of 75 years, the symptoms commencing with an attack of Jacksonian epilepsy in the upper extremity, followed by paralysis of the same arm two weeks later. One month later the epilepsy attacked the lower extremity of the same side and was also followed by paralysis. Epileptic movements of the face without paralysis began two months after the first attack. These symptoms indicate a lesion in the middle third of the ascending frontal convolution, spreading both upward and downward. An operation was performed, but no lesion found at this point. After temporary improvement of the symptoms, death ensued, and autopsy showed that the tumor was situated at the base of the first two frontal convolutions, with atrophy from pressure of the pre-Rolandic convolution,—changes which should have led to affection of the face first and of the leg last. The teaching would seem to be that it is necessary to make a very large

opening in the skull in every case, in order to avoid being misled by the symptoms of localization.

Lépine, of Lyons, ⁹²_{No. 4, '95}; ⁶_{July '95} records a case of frontal tumor in a woman, aged 44, without a previous history of any significance, who had a convulsive seizure one night, followed by loss of consciousness and subsequently orbital headache, vertigo, and noises in the ears. On admission to hospital there were some psychical dullness, difficulty in walking, apparently from some impairment of equilibration, sometimes a tendency to retropulsion, and slow speech. Next day she had an attack in which she became comatose, with the head and eyes turned to the right. The pulse was slow, but unconsciousness only lasted a day. It was succeeded by a month of a condition similar to that in which the patient was on her admission. Then an attack of unconsciousness succeeded, with deviation of the head and eyes to the left and left facial paralysis. On emerging from the unconsciousness a curious psychical change was manifest. She had lost all recollection that her husband was dead (he had died seven years before), and she fancied that the patient in the next bed was her cousin. There was also left hemiopia. Another attack of unconsciousness was experienced, and this was followed by death. At the necropsy the pia mater and dura mater were found adherent at the anterior part of the right frontal lobe, and at this part a gummatous growth was found as big as a walnut. In the longitudinal fissure also, on the left frontal lobe a little in front of the genu of the corpus callosum, a smaller and apparently more recent gumma was found. No other appreciable changes in the cerebrum were discovered. The presence of psychical symptoms in this case is very interesting, especially in association with a morbid condition of the frontal lobes.

In a case seen by F. X. Dercum, of Philadelphia, ²⁴²_{Jan., '95} the post-mortem examination revealed a large glioma, occupying the centrum ovale in the right frontal lobe. It did not involve the cortex, extended as far back as the anterior limb of the internal capsule, and presented traces of recent hæmorrhage. The practical interest of this case centres in the absence of optic neuritis and of the stupor and somnolence so often found in tumors of the frontal lobe. Probably the absence of these symptoms is to be explained by the fact that neither the cortex nor the membranes were involved, but that the tumor was situated well within the centrum ovale. The fact that headache was so little complained of finds a similar explanation.

Obici ⁸²¹_{June 16, '95}; ²_{Aug. 10} reports a case of a woman, aged 35, who first began to suffer from left frontal headache, nausea, and vomiting

in 1887. The pain lasted some hours and kept her in bed. In 1889 she suffered from convulsive attacks, coming on chiefly at night, setting in with sudden unconsciousness and without any aura. The convulsions were general in type, the head and eyes generally turned to the right. In 1890 a relative improvement took place, but in 1891 the symptoms returned more severely and she then complained of deficient sight; the memory and attention were also weakened. In the early months of 1892 she had right facial paralysis with hemiparesis of the right side, chiefly affecting the arm, the muscles of which were in a state of hypertonicity. The headache was more continuous and more diffuse. Almost complete anosmia and amaurosis. There was atrophy of the optic disc. Hearing and taste normal. Voice and phonation unaltered, but amnesic aphasia and paraphasia were present. There was no history of syphilis, cancer, or tubercle. The patient was operated on in September, 1893, and a large glioma found in the region of the second left frontal convolution. The growth was removed at a second operation eight days after the first. For some time the patient seemed relieved by the removal, but had a good deal of trouble from an extensive cerebral hernia. She left the hospital in March, 1894, and died in November of the same year with abscess in the site of the operation.

Tumors of the Temporo-Sphenoidal Lobe.—An exceedingly interesting and important case of tumor involving the lower right temporo-sphenoidal lobe is recorded by H. J. Mackay.⁴⁷ The patient, an adult male, was admitted to the hospital complaining of severe headache, inability to walk, giddiness, numbness and weakness of the left side, cramps in the calves of the leg, with stiffness of the limbs. No history of convulsions or loss of consciousness, but his wife had noted an increasing mental torpor with vomiting, recognizable as of the cerebral type. Examination showed a mental condition of word-deafness; tenderness on percussion over the right temporo-sphenoidal region; slightly impaired motor power on the left side; dilated right pupil with loss of reaction to light; left sluggish; knee-jerks normal; electrical excitability diminished on the left with both currents; muscular, pain, tactile, and temperature senses all much impaired on the left side of the body, especially the first mentioned; sense of smell impaired on both sides; right eye showed optic neuritis; left not examined; taste impaired on both sides; hearing most affected on the right, with ptosis and paralysis of the internal rectus on the right. Necropsy showed a tumor in the right lower temporo-sphenoidal region, involving the middle and lower temporo-sphenoidal convolutions, the body of the tumor occupying most of the thickness

of the temporo-sphenoidal lobe in its lower two-thirds and posterior half. The posterior fibres of the internal capsule were not involved. The fibres of the crista stigmentum showed no visible change, but on the median aspect the right hemisphere was softened in the hippocampal, uncinata, and occipito-temporal gyri, and the medullary matter of the lingual gyrus was of the consistency of pulp. The right oculo-motor was compressed, but there were no naked-eye changes in the fifth of the left side (there was anæsthesia of the face), nor of the Gasserian ganglion, nor of the eighth of the right side. The absence of changes in the sensory tracts of the pons, crus, and internal capsule points, in the author's opinion, to the cortical areas as the seat of the sensory disturbances, and supports the conclusions of Ferrier, Horsley, and Shafer, as modified by Mills, as to the area representing sensory function.

Tumors of the Occipital Lobe.—W. B. Noyes ⁸¹⁴_{MAY 9, '96} relates the history with results of autopsy of a case of tumor of the occipital lobe, occurring as the result of a railroad accident. The case is of especial interest from the fact that for three years after the injury the symptoms were strikingly similar to those which characterize the more severe cases of traumatic hysteria. At no time during these three years were there any symptoms of paralysis, but in September, 1894 (accident occurred in 1891), attacks of vomiting occurred, followed later by defective vision, which culminated in total blindness of the right eye in March, 1895. About the same time the patient developed facial paralysis of the right side, partial deafness, and a paraplegic condition. The paralysis of face and legs disappeared in twenty-four hours, however, although the gait remained spastic, with exaggerated knee-jerks and ataxia of locomotion. Headache was intense and localized in the occipital region and vertex, with tenderness on percussion of the skull in this region. The results of the autopsy were as follow:—

The calvarium was very thin in spots. The dura externally was normal. On removal of the brain the tentorium cerebelli was found adherent, and on its upper surface was a tumor which grew in both directions, but chiefly upward, forward, and inward. It presented internally toward the left cuneus and præcuneus, but did not affect the falx cerebri. It took the place of the entire occipital lobe, extended twenty centimetres laterally to the external limit of the hemisphere, and was in contact with the calvarium, which was thinned in the parts adjacent to the tumor. It measured six centimetres antero-posteriorly and vertically, fitting against the remnants of the occipital and posterior parietal and temporal convolutions. Its general form was kidney-shaped and was placed with its long diameter laterally. It weighed 300

grammes (30 ounces) and was extremely hard, containing ovoid nodules. The rest of the brain was large and œdematous, with flattened convolutions, and contained no other tumor. The right hemisphere was broader and shorter than the left, to make room for the mass. The right occipital lobe, the cuneus, præcuneus, and the fourth and fifth temporal convolutions of the right side were all wanting, or were compressed into an indistinguishable mass. The spinal cord was absolutely normal.

Palisadon²¹_{Jan. 94} publishes notes of a case of tumor of the occipital region destroying the right occipital lobe, especially its posterior and under surface, with softening of the upper surface of the cerebellum. The patient, a soldier 26 years old, presented as symptoms severe headache, total blindness in both eyes, dilated pupils with sluggish reaction, some ataxia, vomiting, and vertigo.

Carter¹⁸⁷_{July, 94} describes the case of a man, aged 36, who had previously had syphilis, and who, following severe headaches, developed double optic neuritis with deafness of the left ear, vertigo, defective memory, and finally semicoma; with complete left hemiplegia. At the autopsy a tumor was found in the left occipital lobe, in its basilar surface, compressing and displacing the left crus.

Tumors of Corpora Quadrigemina.—Attention is called by Guthrie and Turner⁶_{Feb. 1, 94} to the two prominent symptoms of tumor of the corpora quadrigemina,—unsteady gait and oculo-motor paralysis, and, in addition, to the fact that vision is not materially altered, except by the condition of the optic neuritis,—a constant feature of such cases.

In a case seen by Ransom⁶_{May 4, 94} there were, besides the ordinary signs of cerebral tumor,—headache, vomiting, and optic neuritis,—the further features of ophthalmoplegia and an unsteady, reeling gait,—i.e., the two signs laid down by Nothnagel as pathognomonic of tumor of the corpora quadrigemina. The case differs from some in the fact that the ophthalmoplegia was well developed long before marked ataxia set in.

The fact that the ophthalmoplegia preceded the ataxia by some months is corroborative of Bruns's statement that this order of sequence is diagnostic of a lesion of the corpora quadrigemina, while the reverse—ataxia preceding the ophthalmoplegia—points to the cerebellum. (See ANNUAL, 1895, vol. ii, A-41, 42.)

According to Weinland,⁸⁰⁸_{Dec. 9, 94} diminished hearing on the right side, noted in a patient with a tumor of the corpora quadrigemina, depended on destruction of the posterior quadrigeminal tubercle on the left side. In comparing his case with similar ones published by Ferrier and Ruel, the author concludes that an affection

of one of the posterior quadrigeminal tubercles leads to disturbances of hearing on the opposite side; and he adds that the hypothesis of a second means of communication between the cochlear nerve and the brain, properly speaking, independent of that represented by the lateral portion of the island of Reil, is not based on authentic proofs.

Tumors of Optic Thalamus.—In a case seen by E. D. Fisher, of New York, ²⁴²_{Mar., '76} the autopsy showed a large vascular tumor, the seat of a recent hæmorrhage involving the right optic thalamus and compressing by its extension downward the optic tract on that side; the growth proved to be a glioma. The special points of interest in this case were the flaccid paralysis, the diminished patellar reflex, and the rapid onset of the eye-symptoms, which were probably due to the rapid growth of the tumor.

A case of tubercle of the left optic thalamus is described by A. J. Edwards, of Manchester. ⁶_{Aug., '76} The occurrence of attacks of tetanoid rigidity and the presence of well-marked intention-tremor in the right arm were the principal symptoms of interest. The author offers the following theory as to the cause of the intention-tremor. The tumor was pressing on the motor paths in the internal capsule, very probably acting in a precisely similar manner to a sclerotic path in the internal capsule. The nerve-fibres would be unequally implicated, the functions of a few would be destroyed, the conducting power of a considerable number would be impaired, while others might escape entirely. The stimuli proceeding from the cortex to certain muscles would, owing to the diminished conducting power of the supplying nerve-fibres, be too few, and, as a consequence, tremor would result; again, unless the amount of contraction of each of the antagonistic or regulating muscles—which are brought into play in all co-ordinated movements—is exactly graduated, the balance would be disturbed and inco-ordination, as well as tremor, would follow. The implication of the nerve-fibres to certain muscles, with escape of the nerve-fibres to antagonistic muscles, would bring about this inco-ordination.

Gustav Besold ¹⁰⁰⁵_{v. 8, Nos. 1, 2} reports from Strümpell's clinic a remarkable instance of tumors of the same character (hæmangiosarcoma) located in practically the same portions in the brains of two sisters, one aged 16 and one 11. Both parents were living and in good health. Both patients exhibited symptoms which were almost identical, as follow: Headache, progressive weakness, vomiting, diminution of vision, followed by total blindness, with choked disc and optic-nerve atrophy, tonic contractions and, later, permanent contractures, defects of intelligence, speech, and

hearing. In one patient there was also anosmia. In both the right side of the body was more involved. The autopsies showed that in both cases the tumor had originated from the left optic thalamus, quickly extending to the right hemisphere, causing internal hydrocephalus by involvement of the veins of Galen. The author accepts the theory of Thiersch and Cohnheim that many tumors are due to congenital conditions as explaining these cases. In the elder sister other congenital anomalies—an open foramen ovale and double ureter—existed. No similar condition of brain-tumor in two members of the same family has ever been reported, so far as the author has been able to discover.

Tumors of Corpus Callosum.—W. B. Ransom⁴⁷ enters into an exhaustive discussion of the symptomatology of tumors of the corpus callosum, and, as a result of an examination of the various published cases, he gives the following indications for diagnosis of this condition: (1) gradual mental change; (2) moderate headache, vomiting, and optic neuritis; (3) hemiparesis with rigidity, with or without convulsions; (4) or convulsions without paresis; (5) integrity of cranial nerves, and (6) little or no change in the tendon reflexes. But even these, he says, are by no means certain diagnostic signs. The paper concludes with an interesting and instructive discussion of the functions and relations of the corpus callosum, and a list of published cases of tumor of that body, with the prominent symptoms in each. Mental change seems to be almost the only constant one, and the character of the change varies in the different cases.

Richard P. Francis, M. Allen Starr, and Ira Van Gieson⁵ describe a fatal tumor of the corpus callosum in a woman aged 45 years. The initial symptoms occurred fifteen months before death, and consisted of attacks at intervals of from six weeks to two months, in which she suddenly became semiconscious and restlessly moved her hands and turned her head. On the following morning there would be some complaint of headache and general feeling of exhaustion, while the mind seemed slightly clouded. Four months before death the patient was totally blind, owing to double optic neuritis and hæmorrhage into the right retina. The right pupil was dilated and there was right internal strabismus; pupil-reflex absent on both sides; no ptosis. The tongue was protruded in the median line and there was no drawing of the face. There were no tender spots on the head, no anæsthesia or hyperæsthesia, and no headache. Vomiting was present, with progressive mental dullness and emaciation, but no paralysis of any of the extremities. It was found, post-mortem, to be a gliosarcoma or neuroglioma lying between the two hemispheres,

merging into their tissues on either side and with no distinct capsule, but rather growing into the frontal lobes equally.

L. W. Bathurst, of London, ²_{June 1, '96} reports an interesting case of dermoid cyst of the brain in a woman aged 54 years. She was admitted to hospital on October 19, 1893, when it was said that she had been weak-minded and "peculiar" all her life, but that during the last few years she had become progressively worse. She suffered from constipation, was exceedingly dirty in her habits, and did not retain urine long. Her gait was unsteady; she could walk by herself, but shuffled her feet; she would often fall down, the knees suddenly giving way; this would occur from the slightest causes. No paralysis nor loss of sensation was discovered; the knee-reflexes were natural; there was no muscular wasting apart from the general ill-nourished condition of the body. The appetite was generally good, but vomiting was a frequent symptom.

The tumor was found at autopsy to be in the situation of the anterior part of the corpus callosum, which had been destroyed. The inner surface of the hemisphere over the seat of the tumor was atrophied and bulged slightly over the median line, and there was bulging of the under surface of the frontal lobe. In a direction outward and slightly backward the brain-substance had been destroyed so as to expose a small portion of the fibres of the anterior limb of the internal capsule. The corpus striatum was not involved, and the growth shelled out from its surroundings easily. There was no apparent infiltration of tissue, nor did the tumor appear to have any connection with the meninges, but attached to it was the choroid plexus. The ventricles contained excess of fluid and some of the soap-like bodies before mentioned. On cutting into the growth it was found to consist of a definite cyst-wall containing sebaceous matter mixed with numerous dark-colored hairs.

Tumors of Pons Varolii.—In reporting an instance of unilateral tumor of the pons, de Havilland Hall, of London, ⁶_{Aug. 1, '96} states that the case from the first symptom lasted thirteen months, and it is interesting to note that it began by pain referred to the extremity of the malar twig of the trigeminal nerve. The gumma appeared to press equally on the reticular formation and the pyramidal bundle of the pons, and the loss of sensibility to heat and cold on the right side may have been due to pressure on the former.

Tumors of the Aqueduct of Sylvius and the Fourth Ventricle.—Althaus ²_{Nov. 16, '96} relates the case of a lady, aged 39, in whom unmistakable symptoms of a tumor in the right central convolu-

tions became developed in 1882. The chief signs were severe headache, cranial tenderness and tympanitic sound on percussion, a change in her manner, drowsiness in the day-time, epileptiform convulsions, paresis of the left side of the body with increased tendon-reflexes, optic neuritis, impaired memory and inability to think, and sickness and vomiting. The first symptoms had appeared after parturition, and there was a history of a severe blow on the head many years ago, but no syphilitic infection. Treatment by full doses of mercury and iodide of potassium caused rapid improvement, and total disappearance of the principal symptoms in six weeks. Several relapses happened in the course of the following years, at variable intervals, and these yielded to the same treatment as readily as the first attack. The last serious relapse occurred in 1888, and a very slight one, with few symptoms, in September, 1892. Since then the patient had remained quite well and able to enjoy life.

A tumor of the aqueduct of Sylvius is reported by Joseph Collins, of New York, ¹_{Mar. 8, '96} in a large, dull, overgrown-looking boy, with an expressionless face. If left undisturbed he sat in one position the greater part of the time, and showed very little interest in his surroundings. He understood perfectly everything that was said to him, and answered intelligently, but slowly. His memory was fairly good. He was deficient in mental power and apprehension, and continuous mental exertion was beyond him. His gait was the characteristic inco-ordination of one very drunk. When he attempted to walk he staggered, reeled, then plunged, but saved himself before falling. The staggering was not confined to either the right or left. The patellar reflexes were normal. There were no evidences of meningitis. On cutting off the cerebellum, medulla, pons, and cerebral peduncles there was found a grayish, translucent mass filling the aqueduct of Sylvius and projecting backward like a tongue. Anteriorly, it reached as far as the splenium of the corpus callosum and the posterior commissure. The walls of the third ventricle were nearly destroyed, so that that and the lateral ventricle practically formed one cavity. Cultures of the tumor for tubercle bacilli were made, but with negative results.

C. L. Dana, in the discussion, referred to somnolence as a very important symptom in the diagnosis of tumors in the central part of the brain. In a discussion on this subject before the American Neurological Association some years ago, in connection with a case reported by Sinkler, the opinion had been quite generally expressed that in cases where the growth was located in the deeper portion of the brain, not in any particular locality, however, som-

nolence and hebetude were much more pronounced than in cases where the growth was situated near the surface.

Bechterew, of St. Petersburg, ⁸¹_{Aug. 2, '95} describes a case of unrecognized tubercle of the fourth ventricle, in a girl, 18 years of age, who entered hospital on account of right inferior and superior facial paralysis and conjugate deviation of the eyes. The convergence of both eyes was normal. The sense of taste was preserved at the tip of the tongue and weakened on the left half of the base. The electrical reaction of the muscles of the face was normal, and there were no disturbances of sensibility or motion in the extremities. The fundus of the eye was normal. There was total right facial paralysis, paralysis of the external right oculomotor, the acoustic, and right glosso-pharyngeal nerves. For six years there had been a purulent discharge from the right ear and frequent attacks of malaria. In the summer of 1894 violent cephalalgia developed, and in November, 1894, temporary oculomotor paralysis of both eyes, with diplopia during the first days. In December facial paralysis supervened. At the autopsy, ten days after trephining, generalized miliary tuberculosis was found, not suspected during life, and a tubercle the size of a pea on the floor of the fourth ventricle one centimetre in front of the acoustic stria and immediately to the right of the median line.

Hydatid Cysts of the Brain.—A case of *cysticercus cellulosæ* of the brain is recorded by J. M. Forster, of Kingston, ³⁹_{Dec. '76} in a woman, aged 37 years, who had been at the time of her death an inmate of the Hamilton Asylum for over eleven years, and with a history of a previous attack of insanity. At the autopsy, in the arachnoid and lying in the sulci of the brain, there were found four small, cystic tumors about the size of hazel-nuts,—at the posterior portion of the right parietal lobe, on the right frontal near the Sylvian fissure, on the left parietal lobe, and at the outer anterior corner of the left frontal lobe. The cysts were not adherent, but were easily rolled out, leaving a depression in the brain-substance. No other cysts were discovered in the liver or other viscera. Upon microscopical examination the cysts were seen to be *cysticerci cellulosæ*.

Allex, of Lyons, ²¹¹_{Dec. 15, '95} describes a cyst of the base of the brain found at autopsy to be apparently bilocular, located in front of and behind the chiasm and containing a yellowish fluid. The anterior pocket caused a deviation of the two olfactory nerves, which were mostly destroyed; the left optic nerve, also deviated, showed dropsy of the sheath, while the right was atrophied.

Max Bider ²⁰_{Jan. 14, '96} records a case of multilocular echinococcus of the brain in a man 53 years of age, and Stanley ²_{Feb. 14, '96} and

Barrs,² cases of single cysts. A case of sudden death from hydatid cyst of the brain is related by L. Bazin.²⁴⁵

Tumors of the Dura Mater.—Dufour, of Washington,⁶ relates a case of a woman, aged 56, who suffered from paralysis of the muscles supplied by the third, fourth, and sixth nerves of the left side, and exophthalmos and optic atrophy in the same eye. Some months before she had been operated on for empyema of the left antrum, and when seen there was free drainage through the nostril. She was treated with iodide of potassium and mercury, but apparently with only small doses of the former drug. There was no benefit derived from the treatment, and the upper divisions of the fifth nerve became involved and the pain in the head intense. A reopening of the antrum gave a little relief for a few days' only. Her condition gradually deteriorated; the right optic nerve began to atrophy, word-deafness became manifest, and her mind wandered. She died about a year after she was first seen. At the necropsy there was found to be a gumma of the dura mater in the anterior part of the middle fossa, involving the left temporo-sphenoidal lobe. The growth surrounded the internal carotid artery and the left optic nerve and exerted pressure on the cavernous sinus of that side. A second gumma was found in the left olfactory region, and a third lay in the angle at the right of the optic commissure. The last-mentioned lesion probably accounted for the late affection of the right optic nerve.

Bremer and Carson,⁵ report the following case: A man, aged 46, first noticed weakness in his right shoulder six months before coming under observation; gradually paresis and wasting extended to the arm, and the whole limb at times felt numb. Jacksonian epilepsy then developed. On admission into hospital, there was an hypersensitive area a little below and in front of the left parietal eminence; the right arm was completely paralyzed, its muscles being partially atrophied; the right leg was paretic, also wasted to a slight extent; the right side of face paretic. Deep reflexes increased in right limbs; ankle-clonus on this side. Muscular sense and cutaneous sensibility were unimpaired. Engorgement of the retinal veins was the only ocular abnormality. Tumor of the left hemisphere, involving chiefly the upper-limb centres, was diagnosed. At the operation the new growth was found to implicate the dura mater, leaving the subjacent brain-surface apparently healthy. A mass weighing 420 grammes (14 ounces) was removed, but after death on the seven-teenth day it was found that a considerable portion of the tumor (a cylindroma endothelioides) had escaped removal.

Floersheim and Blind, of Paris, ⁷_{Dec., '94} relate a case of fungous tumor of the dura mater presenting the characteristics of tubular epithelioma and secondary to an old cancer of the breast. There were cancerous nodules in the skin, lungs, and pleura.

H. Hahn ⁶⁹_{No. 8, '96} records an hæmatoma of the dura mater of syphilitic origin, and Falkenberg, ⁴_{No. 8, '96} one in which there was an hæmatoma with thin, osseous walls.

Tumors of the Pia Mater.—H. S. Stearns ⁵⁹_{Aug. 3, '96} presented to the New York Pathological Society an endothelioma of the pia mater. It was located directly in the median line, about half-way between the fissure of Rolando and the anterior edge of the brain. It was five centimetres in diameter, about one and one-half centimetres thick, and circular in shape. It had been taken from a woman, 65 years of age, from whom he had removed a carcinomatous breast on February 8th. She had had no cerebral symptoms. Ten days after the operation she developed pneumonia, and died shortly afterward. The growth in the brain was an endothelioma and that in the breast a typical carcinoma.

Du Cazal ¹¹⁵⁸_{July 24, '96} observed three cerebral tumors which were the size of a large nut, hard, elastic, rounded, and seeming to consist of concentric layers like an onion. There were also tumors of the same nature in the spinal cord, kidneys, and on the surface of the pleura. Bacteriological examination failed to reveal the presence of the Koch bacilli in the tumors, which, histologically, presented the structure of fibrocaseous tubercles. From the absence of the Koch bacilli and the analogy of the growths with tumors in which Vaillard and himself had found a special bacillus, ²⁶²_{'91} du Cazal believes that the case was, like this, one of bacillar pseudotuberculosis.

Tumors of the Cerebellum.—Mongour and Rivière, of Bordeaux, ¹⁸⁸_{Nov. 18, '94} record an interesting case of tumor of the cerebellum. It was a tuberculous gumma which had caused, besides the usual symptoms of tumor, complete paraplegia on standing, all the movements of the legs being normal when the patient was lying down. The authors designate as "kinesic" this dissociation of motor function, which is met with only in tumors of the cerebellum and which is therefore an excellent diagnostic sign.

Skvortzoff ³¹_{Mar. 3, '96} reports the case of a woman who, in addition to psychical disturbance in the form of senile dementia, had also loss of equilibrium, with staggering gait and a tendency to fall backward. As she was suffering from a cancer of the breast, the disturbances of gait were attributed to a similar growth in the cerebellum, a supposition which was verified at the autopsy.

In a case of cerebellar tumor seen by Eskridge ⁹⁹_{Jan. 10, '96} the ante-

mortem localization study was more than usually well verified by the post-mortem section. A mixed sarcoma of the middle lobe of the cerebellum was found, implicating the left side more than the right, and by its pressure producing eye-symptoms, distension of lateral ventricles, and involving the nuclei around the Sylvian canal.

Louis Mackall, Jr.,¹⁰⁴ records a case of round-cell neurosarcoma of the brain in a patient who, at the age of 8, injured his head by striking it severely against an iron projection. Two years later vomiting, headache, diplopia, and staggering gait were observed. He had numbness in left hand and foot and lost sight in the left eye, and later had optic atrophy of both eyes. Gastric crises continued, with vertigo and slight convulsive movements, followed by loss of power in the right arm and hand six months before his death. For nearly a year he was deaf in his right ear. After death a tumor the size of a hen's egg was found, almost entirely free, lying between the cerebrum and the cerebellum.

Garceau, of Boston,⁹⁹ publishes the case of a patient, a woman 49 years of age, who had had, two years before she came under observation, a carcinomatous tumor removed from her right breast, and who developed symptoms of tumor of the cerebellum. She declined operation. At the necropsy a carcinomatous growth was found occupying the outer part of the right half of the cerebellum. This was held loosely in position by disintegrated cerebellar matter, and among this there were several small nodules, evidently similar in structure to the larger growth. In the cerebrum, also, two tumors were found,—one posteriorly, just over the cerebellar growth, and one occupying the Rolandic region of the left hemisphere. The latter, no doubt, was the cause of the convulsions which occurred just before death.

P. de Michele¹⁰³⁹ describes a case of gliosarcoma of the cerebellum. The author concludes that (1) the gliosarcomata can clinically manifest themselves by a course of disease similar to that of a chronic inflammatory process; (2) their clinical manifestation and their histological structure make it probable that they are of infectious origin; (3) the most important diagnostic symptoms for localization of a process in the vermis inferior of the cerebellum are (a) lateral curvature of the vertebral column, (b) progressive weakness of the extremities, (c) general hypotrophia, and (d) unconscious yelling or screaming.

On the ground of persistent occipital pain, peculiarities of gait, vomiting, optic neuritis, vertigo, and forced movement, Dana, of New York,⁵⁹ made a diagnosis of tumor of the cerebellum. Under iodide of potassium the patient was greatly improved for a

while, but the symptoms recurred; no new ones developed; there was great nausea, vomiting, prostration, and difficulty in swallowing, and finally death.

The autopsy revealed a tumor an inch and a half in diameter, of rounded form, almost entirely encapsulated, attached to the anterior portion of the right lobe of the cerebellum, pressing upon the right lateral surface of the medulla and to some extent upon the pons; also pressing upon the right cerebellar lobe, to which it was attached, somewhat upon the median lobe, but there could not have been much pressure directly upon the medullary centres or cranial nerves in front of the medulla. Microscopical examination showed that it was a spindle-cell sarcoma. Dana said the case was especially interesting to him, as he believed it was one in which the cerebellar tumor could have been successfully removed. Examination of the specimen might give the surgeons a little encouragement in attacking these cases. In the discussion Bryant cites Starr's figures as to successful results in this class of operation, which were eighteen operations with one recovery. In a case seen by him ²⁰⁸⁸ Purves Stewart diagnosed intra-cranial lesion on general grounds; and, from the absence of distinct motor paralysis, combined with the presence of a staggering gait and distressing vertigo, the cerebellum was considered to be the part affected. Further, on account of the marked headache over the left eye and the deafness in the right ear, it was supposed that the tumor was in the lower part of the lateral cerebellar lobe,—low, because apparently the spinal accessory seemed implicated.

The writer's explanation of the left frontal headache and the value accorded to it is that each superior cerebellar peduncle arises mainly in the interior of one dentate nucleus, but also, in part, from the cortex of the cerebellum, and especially from the lower part of the lateral lobe. Its fibres, when traced upward, are found to decussate with those of the opposite side between the corpora quadrigemina. Some of the fibres appear to end in the red nucleus of the tegmentum of the opposite side, while other fibres pass the nucleus and run on to the frontal lobe of the opposite cerebral hemisphere, thus constituting a fronto-cerebellar tract. When the patient was trephined over the right lobe of the cerebellum, a tumor was found (fibrosarcoma) half an inch below the surface and low down in the lateral lobe,—i.e., in the position in which Purves Stewart located it. The subsequent history of the patient was very satisfactory.

Osteoma and Hyperostosis Cranii.—James J. Putnam, of Boston, ¹ Aug. 17, '76 reports four cases of hyperostosis cranii. Baumgarten had pointed out that the disease generally began in youth,

and in one of the author's cases the first indications had been noticed when the patient was 5 years old, in the form of two exostoses near the vertex, which afterward had assumed a great size. The cranial bones usually became very dense, as from an inflammatory change, but sometimes the diploë was rarefied. The question of operation suggested itself as a means of reducing intra-cranial pressure or of cutting off the blood-supply to the bone. In this connection it might be noted that the channels of the meningeal vessels were sometimes strongly marked, sometimes nearly obliterated. Starr, of New York, in the discussion, said that these cases were more advanced and more extreme than those he had reported. He had tried thyroid extract in one of his cases without benefit. He had been led to do this as he had seen some improvement after its administration in a patient with acromegaly.

Fraser showed to the Glasgow Pathological Society ²¹³_{Nov., '94} an osteoma which occupied the base of a considerable cavity in the right frontal lobe of the cerebrum in a female patient aged 55 years. At the post-mortem examination the dura mater was found to be roughened and thickened in front, especially over the right frontal lobe, and firmly adherent to the edges of the hemispheres. A fairly large effusion (about 3 ounces—90 grammes) of dark, venous blood in the subdural space, chiefly on the right side; also patch of subarachnoid effusion in the posterior and lower part of parietal lobe; longitudinal sinus filled with dark, semicoagulated blood. There was marked atrophy of the right frontal lobe; it was shrunk and small compared with the left. A case of auto-genic exostosis of the skull is recorded by L. Damaye, of Paris. ⁷_{Dec., '94}

Surgical Treatment.—In a contribution to the subject of brain-surgery with especial reference to brain-tumors, Starr ⁶⁹_{Feb. 1, '96} reports the following statistics: Out of 162 cases operated upon for brain-tumor no tumor was found in 42 cases; in 7 the tumor was not removed; 72 cases of removal resulted in recovery and 35 terminated fatally. This analysis is considerably at variance with the table published by Chipault, based upon the results in 123 cases collected and investigated by him, in 63 of which, or 51 per cent., death resulted from the operation.

Much aid was at first expected, in the diagnosis and localization and correlated surgical treatment of brain-tumor, from the application of the Roentgen or X-rays; but Keen, ⁵_{Mar., '96} who has investigated the subject, says: "In tumors of the brain the bones of the head (especially as the rays would have to penetrate two thicknesses of bone) will absolutely preclude any use of this method in diagnosis. All such statements as the above apply, of course, only to our present knowledge."

Cerebral Abscess.

Ch. Féré and Faguet, of Bordeaux, ¹⁴_{Aug. 25, '96} found the streptothrix in a case of abscess of the brain characterized during life by epileptiform attacks. This streptothrix developed well in different culture-media, though only completely on potato. In the primary pus and in the potato culture it presented the form of ramifying filaments with knob-like terminations. It stained well by Gram's method. Inoculated into the guinea-pig it did not prove pathogenic. Inoculation into a rabbit caused diffusion of the parasite in the organism without phenomena of reaction or of pseudotuberculosis.

Brouardel and Josué ¹⁰⁰_{Apr. 2, '96}; ²⁷⁸_{July} report a case of brain-abscess in which the contents, as tested microscopically by cultures and by inoculations, appeared to be absolutely sterile. The case is of interest as being the first observation of its kind and as affording an explanation of the encysted cerebral abscesses of long duration that have been heretofore reported. While their careful study revealed no infectious origin in this case, they suggest that the abscess might have had an aural or a sinusal origin which itself disappeared, and later the microbes exhausted themselves in the slow development of the abscess. This last finally caused death by opening into the ventricle. The condition is comparable to certain hepatic abscesses that have been reported containing sterile pus.

J. T. Eskridge, of Denver, ⁹_{July 27, '96} reports three cases of abscess in the right cerebral hemisphere, all occupying nearly the same position in the centrum ovale, all attended with left lateral homonymous hemianopsia, with great weakness of the left arm and leg, the loss of power being greater in the leg than in the arm, the face escaping almost entirely, and with sensory impairment on the left side. The infective material in two was probably derived from distant suppuration, and in one from an injury of the scalp, although the incomplete post-mortem examination renders this uncertain.

L. Siron and O. Josué, of Paris, ¹¹⁵³_{July 22, '96} describe a case of multiple cerebral abscesses due to the pneumococcus and coincident with an abscess of the lung.

Two abscesses of the brain, caused by septic emboli resulting from a gunshot wound of the lung inflicted thirty-two years before, are described by Eskridge and Parkhill, of Denver. ¹_{Aug. 10, '96}

C. H. Martin, of Montreal, ²⁴⁷_{Nov., '96} reports from the laboratory of Chiari two cases of metastatic abscess of the brain from primary actinomycosis of the lungs. Both cases were considered clinically to be of tuberculous origin. Martin calls attention to

the fact that, in the first of his cases, both apices of the lungs were involved, and, therefore, Israel's great point in the differentiating of actinomycosis from tuberculosis—that the condition affects the bases of the lungs—does not always hold good. In the first patient three abscesses the size of walnuts were found in the left occipital lobe. In the other case an abscess as large as a goose-egg, with numerous smaller seats of suppuration, was discovered in the upper third of the ascending frontal and parietal convolutions and the posterior third of the middle and superior frontal, together with a part of the corona radiata. Besides the cases described above, only four reports upon actinomycosis of the brain are found in the literature,—one primary, one by continuity, and two by metastasis from the lungs. A case of cerebro-spinal actinomycosis is recorded by Dor, of Lyons. ²¹¹_{Dec. 15, '96}

Epilepsy.

The literature of the year reflects many observations of interest and importance with regard to the general subject of epilepsy, especially with reference to the etiology and pathology. Unfortunately, our therapeutic resources have not been materially increased nor have the surgeons materially improved the prognosis heretofore imposed by experience. Apparently it is in the direction, however, of surgical procedure that we are to look for measures of most definite relief in a selected minority of cases.

Etiology and Pathology.—Bechterew ⁷⁵_{May 1, '96} thus sums up the results of investigations by himself and by others,—Meyer, Suschtschenski, and Wyrubow,—at his instance, on the genesis of the epileptic attack: "Epileptic attacks can be produced in adult animals by excitation of the cortical centres. In case the basal regions participate, it is mainly in producing tonic contractions. Under other conditions—such as mechanical irritation of the pons, cerebral concussion, and poisoning—the basal regions (pons and medulla) can also cause epilepsy. Still, in these cases, the cortex undoubtedly takes part in the development of the attack, and the epileptiform character, moreover, depends upon its irritation."

Bleuler ³⁴_{No. 22, '96} found, in the brains of 26 epileptics—15 males and 11 females—examined by him, that there was always a distinct hypertrophy of the cortical neuroglial fibres lying between the pia mater and the outermost layer of tangential nerve-fibres. The glia-fibres were increased in number and thickness, had a tendency to form bands running in a parallel direction, and often formed "whorls" around the entering vessels. This change was spread over the brain-mantle generally, but there were places in which it could not be observed; the author does not enter into

the question as to whether any part of the brain was especially affected. The intensity of this gliosis was not proportional to the duration of the disease.

P. C. Knapp, of Boston,⁵ thinks that, in view of the neuroglial sclerosis found in the brain-cortex, it is not possible to attribute epileptic attacks to astigmatism or errors of refraction, as has been done by some observers. There is some reason for believing that astigmatism is commoner in epileptics than in healthy persons, though in the latter refractive errors are very common; but, even if this be so, astigmatism may be a mark of degeneracy rather than an etiological cause. A critical examination of cases of reflex epilepsy would certainly eliminate many of those reported under this head. The author states that a considerable number of them are undoubtedly cases of hysteria, and in others the dependence of the epilepsy upon the alleged source of irritation is certainly doubtful.

The continuance of bilateral convulsions after ablation of the motor cortex of one hemisphere has been considered as affording evidence of independent action in subcortical centres. Weitting⁸⁴⁴ opposes this view, contending, as a result of a series of experiments, that bilateral removal of the cortex wholly prevents the occurrence of a fit. The experiments as described, however, seem inconclusive as to the proposition.

Von Monakow³⁶⁸ ¹⁰⁶ instances a case of unilateral epileptiform seizures, evidently of Jacksonian type, in which not only had the cortical motor centres lost all inceptive function, but the transmissive function of the pyramidal tracts of the affected side was also in abeyance. The case he describes was one of cerebral hemiatrophy, with complete destruction of the pyramidal bundles of one side. Winkler⁵⁸³ reports a somewhat similar case.

Naunyn¹¹⁴ ⁵ reports having noticed that in three men, all above the age of 63, with a history of epileptiform attacks, it was possible to bring on attacks precisely similar by compression of the carotids. He assumed that the spontaneous attacks were due also to cerebral anæmia, which, on account of the weak heart and arterio-sclerosis existing in the patients, was not far to seek. He therefore made experiments with carotid compression in persons who had never had epileptiform attacks and who had no signs of brain disease or disturbance of the circulation. So far as made, the observations seem to prove that senile epilepsy depends on circulatory disturbances due to disease of the heart or vessels. In two of Naunyn's cases bromides had no effect; in the third it seemed to increase the severity of the symptoms. The observations also show that compression of the carotids is of no value in

the diagnosis of thrombosis of the basilar artery or of anomalies in the circle of Willis.

Maupaté ³⁶¹_{Aug. '96} regards, as late epilepsy, that developing after the age of 30 years. Of 120 cases met with by him only 20 belonged to this category. *Epilepsia tarda* is but a variety of epilepsy which owes its peculiar characteristics to the age at which it develops and the causes which induce it. It never occurs except when there is an hereditary predisposition, always degenerative; but it is, nevertheless, symptomatic, if it be understood by that term that it is consecutive to a destruction of the brain by well-known agents and related, in a certain measure, to the evolution of these agents. The symptoms are manifestly those of common epilepsy. Once declared, the disease may improve rapidly if the cause be removed, or may remain stationary, in which case early dementia, which is the rule, appears like the superadded mental disturbances, to be attributable less to the epilepsy than to its provoking agent. The treatment is that of epilepsy, in general, combined with the suppression or cure of the cause.

The influence of extreme slowness of pulse in the causation of epileptiform convulsions is discussed by J. S. Bristowe, of London, ⁶_{Sept. 22, '84} who relates, among others, the case of a man who first consulted Gibbings in May, 1882, for weakness, attacks of dyspnœa induced by exertion, but coming on also in the night, and a troublesome, noisy cough. His heart was free from murmur, intermittent, but beating about 60 in the minute, and his urine was free from albumin. He continued ill for some months, but was able to return to business on November 21st. On December 2d Gibbings was again requested to see him, and was struck with the fact that his pulse was then only 44 in the minute, but quite regular. He grew steadily worse, and on January 3, 1883, was seen in consultation with Sir Andrew Clark. He complained of dyspnœa on the least exertion and of frequent feelings of faintness, and his pulse was regular and only 34. Subsequently the pulse (continuing regular) became slower and slower, the feelings of faintness being much more frequent and then associated with epileptiform attacks. After this the patient became much worse; the fits became distressingly frequent, and apt to be brought on by the slightest exertion. His pulse became slower (though still regular), and on January 20th was counted at 12 to the minute. Henceforth it varied between 15 and 31, and, curiously, the rate appeared to increase as the end approached. After February 26th he seemed to improve, and he got up and worked at his books for two or three hours a day; but he still suffered from dyspnœa on exertion, his pulse, however, beating at the rate of from 30 to 34

to the minute. On March 6th, while at stool, he fainted, and died in two or three minutes. At the post-mortem examination, at which Moxon was present, the heart and all the organs were found to be apparently perfectly healthy; there was, however, about a pint of serous fluid in the right pleura. Very few such cases, as far as the author knows, have been recorded. That the fits are epileptiform in character is the opinion of all who have witnessed them; at the same time there is little, if anything, to distinguish them from momentary and sudden faints, in which, also, the patient becomes pale and momentarily insensible and slightly convulsed, and, if standing at the moment of attack, falls as if shot. In all the recorded cases the pulse had a general tendency to be very slow,—often beating, when there was no fit, at the rate of from 20 to 30 to the minute. At the same time it is important to note that in some cases the pulse would rise to 70 or even 120 to the minute after an attack or would be generally fairly rapid.

In a case of epileptic attack with transitory slow pulse, seen by Riolacci,²²⁸ July 15, '96, the patient had intense dyspnoea without stethoscopic signs, the heart being perfectly calm. The day after the attack only slight cephalalgia remained, the condition being normal, except that the heart beat only 45 to the minute; auscultation showed no diastolic murmur, no irregularity of pulse, nor venous pulse. The slowness of pulse persisted for eight days, and when the man left hospital, fifteen days after entrance, he was well and the pulse had gone up to 80.

In reporting a case of diabetic epilepsy, George W. Jacoby, of New York,⁹⁴ Nov. 2, '96, states that we are, by this class of cases, forced to the conclusion that the epileptic attack is an acute intoxication, that it is an expression of conditions of varied nature, and that in the organism of epileptics a poison is generated or various toxins which normally exist there are increased in amount until an accumulation of this poison finally brings on the attack.

Voisin and Petit,²¹³ Apr. to Aug., '96; Sept. 94, in summing up their observations on epilepsy due to intoxication, conclude that reflex epilepsy is not accompanied by gastro-intestinal troubles and is less grave, whereas epilepsy by intoxication is always preceded and accompanied by gastro-intestinal symptoms and is graver. Epilepsy by intoxication may arise from an auto- or hetero- infection. Reflex epilepsy may be transformed into infective epilepsy and take its symptoms, course, and termination. In epilepsy by intoxication, when the condition is accompanied by cortical hemiplegia, there often follows, with the ordinary epileptic dementia, a kind of spasmodic tabes or cerebral diplegia.

W. H. Hattie, of Halifax, N. S., ⁹_{Mar. 21, '96} contributes, as an argument in favor of the auto-intoxication theory of epilepsy, the fact that patients treated by bromide of potassium, alone or in ordinary mixture, at the Nova Scotia Hospital for the Insane, showed an average of 12.3 fits per patient per month; this figure was reduced one-half, during a period of eighteen months, under ordinary treatment combined with intestinal antiseptics.

Gowers, ⁶_{Aug. 17, '96} in opening a discussion on epilepsy and its relation to insanity, pointed out that the frequency with which insanity can be traced in the families of the epileptic is approximately known; all facts, however, regarding inheritance are below the truth. It is interesting to note that in the series of one thousand four hundred and fifty cases analyzed for the first edition of "Epilepsy," inheritance was traceable in 35 per cent., but in another series of almost the same number, recently analyzed for a forthcoming edition, the percentage rises to 44.5 per cent. This is because a larger proportion of the cases were seen in private, and in them the facts of heredity can be far more certainly obtained. When these private cases are separately considered the proportion of heredity rises to 48.4 per cent.; so that at least one-half of the cases of epilepsy are inherited.

Obreja ⁶⁷³_{Oct., '96} finds that in the evening preceding an attack of epilepsy the toxicity of the urine is greatly diminished; but immediately after the attack it increases markedly, to diminish progressively afterward. In the case of a criminal simulating epilepsy, he was able to detect the fraud by examination of the normal constituents of the urine. He also states that the approach of a period of excitement in melancholia or periodic insanity may be prognosticated by a diminution of the urinary toxicity.

According to J. Nelson Teeter, of Utica, ²⁷⁸_{Jan., '96} the amount of urea excreted is far below the normal average of 33.19 grammes per twenty-four hours, the average here being only 11.93 grammes. This is contrary to the results of Régis, who finds 25.17 grammes, which he says exceeds the normal by about 2 grammes. Observations were continued in one case by Teeter, and particular attention was paid to the amount of urea excreted before and after the epileptic convulsions. All the urine passed by the patient until the time of the fit was considered to be before the convulsion, that excreted for eight hours after each attack was labeled as after the fit. A uniform variation in specific gravity and the amount of the urea present in the two specimens was invariable during a period of about four months' examination, the urine passed after the fit having a higher specific gravity and a larger amount of urea. Whether the urea exercises a special

influence in producing this auto-intoxication cannot be stated from these researches, but the fact remains that it is insufficiently eliminated, and this truth opens to us a new field,—the study of the influence of toxic substances in the production not only of epilepsy, but all diseases of nervous origin.

A case of malformation of the genital organs, infantilism, and feminine appearance in an epileptic is described by P. C. J. Van Brero, of Buitenzorg, Java.⁴⁵² The patient, 22 years of age, has a large pelvis and hips, the thighs being fat, round, and feminine; the buttocks are well developed and rounded, and in the sacral region are the hollows usually seen only in women. The lower limbs, as well as the arms, are beautifully molded, more or less graceful in movements, the entire appearance being that of a child about to be transformed into a woman. The condition of the genital organs was that of hermaphroditism, there being, in addition to an arrest of development, a congenital malformation.

Lvoff,¹⁴ July 10, '96 describes the case of a female, aged 20, who died after attacks of epilepsy dating back to the age of 4 years. Walking had been difficult, and contractures and hemiplegia had occurred during the last four years of life. Autopsy showed total atrophy of the left hemisphere, which weighed 150 grammes (5 ounces) less than the right. There was no sclerosis, but simple atrophy involving all the psychomotor regions.

Symptomatology.—For about six years Cénas,²²⁸ Sept. 15, '96 has systematically searched in the patella for a phenomenon analogous to that observed in the foot in certain patients, and known under the name of "epileptoid trepidation," the "clonus of spinal epilepsy" or the "foot phenomenon." In cases in which this clonus existed, Cénas has always, with rare exceptions, been able to obtain trepidation of the patellar. He has also been able to produce it in many cases when the foot phenomenon was absent or after involuntary contracture of the muscles of the leg in emotional subjects. His method is a simple one,—the patient being in the dorsal decubitus, the lower limbs extended, the patella is suddenly lowered, parallel to the axis of the limb, by pressing on its upper border. It is sometimes necessary to repeat the manœuvre two or three times in succession, never leaving the patella to itself, though not opposing its movements of ascension. The trepidation obtained by the method consists in oscillations from above downward and from below upward, presenting the same characteristics as the alternating movements of flexion and extension of the foot, the same regularity of rhythm, and the same rapidity. When the trepidation of the patella is very marked, it extends to the thigh on the opposite side, as is frequently observed with the patellar-tendon reflex.

Being relatively regular and not extending to the muscles of the leg or the flexors of the knee, this trepidation is, in Cénas's opinion, a true epileptoid trepidation analogous to the foot-clonus.

A hitherto-undescribed form of epilepsy—the epileptic tic of infancy—was observed by Ferrannini³ Nov. 8, '96 in three patients, the youngest scarcely a year old and the oldest 7 years. The condition appeared without any apparent cause and without any signs of motor or sensory paralysis at any stage of the affection. The clinical picture was characterized especially by a sort of motor tic, sudden and instantaneous, and sufficient in itself to determine its comitial nature. There was, besides, a sudden pallor, followed sometimes by redness, mydriasis, an expression of hebetude and immobility, and absolute loss of consciousness during the muscular shock. The patient had no recollection of the attack, even immediately after its cessation.

J. W. Alexander, of Leeds, Aug. 11, '96⁶ records an interesting case in which the patient recovered after having had an extraordinary number of convulsions. The aggregate number of fits recorded during twenty-one days amounted to three thousand two hundred, and five. Each fit was a distinct entity, well marked and severe, but of short duration, generally lasting from about thirty to forty seconds, and separated from that immediately preceding and succeeding it by a period of semi- or complete consciousness.

Siemerling⁴ Nov. 22, 23, '96 maintains that a dreamy state of consciousness, rather than total or partial amnesia, constitutes the most significant feature of the epileptic psychoses.

Bombarda¹⁰⁹⁰ Apr. '96; ²⁷⁸ Apr. combats the belief that loss of consciousness during the epileptic attack is necessarily complete, and gives instances to the contrary, ranging from cases in which, while there was evidently some consciousness during the attack, there was no subsequent recollection, through one in which there was a confused memory, up to a case in which the patient remembered correctly questions asked during the attack.

V. Parant, of Toulouse, Aug. 14, '96¹⁴ concludes that epilepsy is not, by itself, a reason for irresponsibility, but that there might occur with it irresistible impulsions, producing absolute irresponsibility, even with perfect consciousness of the act on the part of the subject, and that, aside from this condition, every epileptic not insane or unconscious must be held to be responsible, with only possible attenuating circumstances.

In the discussion Garnier insisted on the general attenuation of responsibility of epileptics, but Vallon claimed that no such general rule could be maintained—only the study of the particular act would sometimes suffice. The medical expert should show

the court the close connection between the disorder and various mental disturbances, which might be a causal factor of crime in many cases, but this was not universal or invariable.

Under the name of "post-epileptic alopecia" Ch. Féré⁴⁵²_{Aug., '96}¹²¹_{Oct.} describes a special form of baldness which follows epileptic attacks. It manifests itself in the form of patches, generally multiple, of a rounded contour, attaining almost from the beginning a definite size, never presenting a trace of congestion or lesion due to scratching; there is neither alteration of the skin or hair, and spontaneous cure takes place at the end of some weeks or months. These facts, which, in their evolution, recall nervous alopecia, deserve to rank among the post-paroxysmal trophic troubles of epilepsy.

Treatment.—Isabel M. Davenport²⁷⁸_{Nov. 1, '96} has made a careful and thorough trial of Flechsig's plan, extending over a period of more than a year, in eleven cases, and concludes that, although the treatment does not result in recovery, it is of benefit in that it gives many of these unfortunates a gratifying respite from the attacks and thus adds to their comfort. Furthermore, it is soothing and quieting to the irritable patients and exhilarating to those suffering from depression, thus relieving distressing symptoms in both cases. Through the cessation of the seizures and other annoying symptoms the patient is enabled to recuperate physically, and for these reasons the author believes that it is desirable to repeat the treatment at intervals of two or three months.

L. P. Clark, of Middletown, Conn.,⁸¹⁴_{June 15, '96} from personal experience in some selected cases of epilepsy, finds that the results of Flechsig's opium treatment do not justify its use, except in cases where the other forms of treatment have been tried and found to be entirely insufficient.

Bechterew, of St. Petersburg,⁷⁵_{Dec. 1, '94} ascribing the epileptic attacks to vasomotor changes, has used for some years, in connection with the bromides, an infusion of adonis vernalis, sometimes associated with codeine, in the following proportions:—

R Adonis vernalis,	2.00 to 3.75 grms. (31 to 57 grains).
Water,	180.00 grms. (6 fluidounces).
Bromide,	7.50 to 11.25 grms. (1½ to 2½ drachms).
Codeine,	0.12 to 0.18 gm. (1½ to 2½ grains).—M.

Of this mixture he gives a tablespoonful four, six, or even eight times a day. The adonis vernalis is first infused in the water, then the bromide and the codeine added.

Guicciardi⁵⁰¹_{Sept., '96} states that Pellizzi had never seen, after using this treatment in twenty-five cases for five months, complete cessation from the attacks; the remedy seemed to act solely through

the amount of bromide it contained. It can apparently be taken for a long time without unpleasant consequences, and it is especially useful in those cases in which the heart's action is weak.

Lui⁵⁹¹_{Sept., '96} has used Bechterew's treatment in ten cases with apparently better results. He found in all cases a distinct diminution in the frequency and severity of the attacks.

Taby, of Lyons,²¹¹_{Dec. 29, '96} arrived at the conclusion that the addition of codeine is not an advantage, as to this must be attributed the resulting constipation and somnolence, while bromism is thus not avoided. The adonis acts as a stimulant to the heart and increases the flow of urine, although it does not prevent the hebetude or the attacks.

Ch. Féré⁹²_{Mar., '96; May 11} speaks of the importance of continuing the bromides even in cases which are apparently cured. He instances three cases of epilepsy associated with infantile hemiplegia, epilepsy persisting from infancy, and the ordinary epilepsy of adolescence. The bromide brought about a complete suspension of the fits. After some time it was gradually diminished and then stopped.

Anthony Roche, of Dublin,²_{May 18, '96} has tried bromide of strontium in a number of cases, giving 10 grains (0.65 gramme) of potassium bromide with 10 grains (0.65 gramme) of strontium bromide three times daily to adults. None of the cases were cured, but all of them were much relieved. In all other bromides had been employed before, and the combination of the strontium seemed to be more beneficial. It has long been noticed that a combination of the bromides acts more favorably than any one, and the author advises to impress on the patient that he must take the medicine for a long period, whether it has at first a beneficial effect or not. The bromide of strontium is, in his opinion, well entitled to further trial.

W. E. Stainton Stanley, of Llanwrtyd Wells,²_{June 1, '96} writes that if those who have been trying this drug in 7-grain (0.45 gramme) or similar doses will give its proper dose (30 grains—2 grammes) they will get very different effects, and if there is combined with it a fair dose of eserine the effect on epilepsy is marked.

According to Wulff,⁷⁵_{Nov. 11, '96} when symptoms of bromism, acne, etc., are troublesome, ethylene bromate, which acts at least as well as the bromides, can be advised. It is, unfortunately, disagreeable in taste and smell, but is borne well by the stomach. Belladonna seems to work better in the form of Trousseau's pills than as atropine, always in increasing doses. Nothnagel has lately combined zinc oxide with the belladonna, the former in gradually increasing doses (0.03 to 0.3 sed), with good results, and this combination is to be recommended. Moeli has advised alternation of

atropine and bromides as very effective, on the analogy of the opium-bromide treatment.

Ch. Féré³²⁷_{Nov. 21, '96} claims that belladonna may, in grave cases, bring about a prolonged suspension of the attacks analogous to that produced by the bromides. It is, therefore, a remedy not to be neglected.

G. Angelucci and A. Pieraccini,³⁷⁶_{Nov. 1, '94} from their experience with borax, believe that it is a useful remedy against convulsive attacks of an epileptic character, diminishing their frequency or entirely suppressing them, attacks of vertigo sometimes appearing in their stead.

Féré³²_{Sept., '96} has recently published an account of an extensive series of observations of the effects of borax in epilepsy, the result of which is to show that, while in certain cases benefit is conferred by the use of the drug, in most cases the disadvantages are such as to more than counterbalance the slight benefits procured. Lui and Guicciardi,⁵⁹¹_{Sept., '96} after testing the drug, conclude that, on the whole, it is of no value in epilepsy.

C. S. Potts⁸⁰_{Jan. 25, '96} gives an account of some cases treated by *solanum Carolinense*. In 17 cases in which a fair trial was given 12 showed more or less improvement, while the other 5 (2 of them organic) showed no improvement. The general conclusions arrived at by C. S. Potts were: (1) that the drug has a decided influence for good upon the epileptic paroxysm; (2) that this influence is probably not so great or so sure as that obtained by the use of antipyrin and the bromide-salts, or even of the mixed bromides; (3) that in those cases in which it is of service it relieves the paroxysms without causing other unpleasant symptoms, such as are sometimes caused by the use of large doses of the bromides, and (4) that the dose ordinarily recommended (10 to 15 drops of fluid extract) is too small, and that as much as a teaspoonful or more four times daily is often needed to secure results. No unpleasant effects from the drug were observed excepting a mild diarrhoea in some cases.

C. F. Barber⁶¹_{Mar. 14, '96} believes that the drug unquestionably has an influence over the disease, although mild. It sufficiently controls the disease to warrant us in substituting it for a time to relieve our patients of the depression produced by the bromide treatment. Its toxic effects are *nil*.

E. C. Carr, of Coshocton, O.,⁸⁰_{Mar. 16, '96} is inclined to the belief that fairly large doses are more likely to be of use, and has had no complaint of any disagreeable effects.

H. G. Mackid, of Calgary, N. W. T.,²⁰²_{Dec. 20, '96} began by giving 1 drachm (4 grammes) of the fluid extract of the drug four times a

day in 1 case without improvement. The doses were gradually increased to $\frac{1}{2}$ ounce (16 grammes) three times a day, when the fits became less frequent and severe. On her own responsibility the mother now gave 1 ounce (31 grammes) three times daily, and speedily the fits almost stopped. She then gave 4 ounces (120 grammes) "once in a while," and since then the child has not had a single fit. The remedy is still being taken,—4 drachms (16 grammes) once a week.

E. D. Bondurant⁹_{Mar. 20, '96} reports that for five months he gave this new remedy a trial in the treatment of eleven epileptic insane patients in the wards of the Alabama Insane Hospital, but finds that scarcely any line of treatment heretofore employed has given such unfavorable results as has the use of the solanum.

Dromain and de Pradel Bra⁹²⁷_{July 29, '96} report cases of epilepsy which, in their opinion, manifested decided improvement from the administration of renal extract, the fits disappearing during the treatment and returning when the drug was withheld.

Surgical Treatment of Epilepsy.—E. G. Mason,⁹_{Mar. 21, '96}²⁴²_{June} in a paper upon this subject, presents conclusions based upon an analysis of 70 cases collected from contemporaneous literature, which reflect, with fair accuracy, the present general consensus of opinion among neurologists as to the value of surgical procedure in such cases. The author confines his subject entirely to operative interference upon or through the skull, and does not include or refer at all to surgical measures for the relief or removal of supposed or actually existent reflex causes. His conclusions are as follow :
(a) A certain small proportion of cases will be cured (3 out of 70).
(b) A certain larger proportion will be improved (6 out of 70).
(c) An even larger proportion will not be improved at all (18 cases out of 70, including 3 in which operation proved fatal and 1 dying subsequent to operation from malignant disease). (d) An operation upon almost any case will produce temporary cessation of fits.

Of the entire 70 cases, only 27 afforded data for positive conclusions, as stated above. Of the remaining 43, in 41 the time of observation subsequent to operation was either not stated or was too short to justify any conclusions of positive value as to the final result, though most of this number were reported as either much benefited or cured. In 2 patients the fits ceased, but, as bromides had been continued, the cause of the cure was uncertain. An interesting inference, which seems perfectly legitimate as a conclusion, presents itself with reference to these 43 cases. If accepted, it very materially modifies the status of surgical procedure in epilepsy.

If in the 27 cases in which sufficient time had elapsed 3

positive cures were effected, it would seem justifiable to conclude that at least an equal proportion of the 41 in whom the time had been insufficient would prove cured cases eventually. An estimate even higher might be fairly made, since none of these were fatal, while 4 of the 27 died. Upon such a basis of estimation, the proportion of cures from operation, as indicated by this table, would be about 10 per cent., with a mortality of about 5 per cent. from the operation. When one recalls the extremely disappointing results of treatment by drugs or other means in epilepsy (prognosis varies from 5 per cent. to *nil*, as to cures) it will be seen that this analysis very positively establishes the superior value of operative procedure. With a more intelligent discrimination in its application—many of these cases should never have been touched by the surgeon—there can be no doubt but that, in selected cases, operative interference is our most valuable and certain resource. This necessity for intelligent discrimination is especially emphasized by Mason, who outlines, in detail, certain principles to be given careful consideration in all cases.

Meningitis.

As a result of the remarkable activity and the advanced methods of research in bacteriological investigation in recent years, our knowledge of the pathogenesis of meningitis has been quite clearly and satisfactorily elucidated. It is true that the results are to a certain degree chaotic as yet, no specific micro-organism having been positively determined as standing in a constant causal relationship. There is, however, constantly accumulating evidence tending to support the belief that, while any one of several micro-organisms may induce meningitis, by far the most common is the *diplococcus lanceolatus*.

Jaeger, ⁵⁸_{B.19.H.2; Feb.1, '06}, for example, finds that in 60 to 70 per cent. of recorded cases in which the point has been investigated, Fränkel's *diplococcus lanceolatus* has been found. Jaeger investigated ten cases and found that in two in which there was definite pus formation the diplococci were present in enormous numbers; in those in which only fibrinous exudation existed the micro-organisms were scantier. Unlike the *gonococcus* of Neisser, they were found inside the nucleus of the cells. From their difference in pathogenic properties, their long vitality in cultures, and from the fact that they appeared in culture as oval forms, sometimes collected in chains divided in the long axis, he concludes that the micro-organism is not the *pneumococcus*. He therefore proposes to call it the "*diplococcus intra-cellularis*," and regards it as the true cause of epidemic cerebro-spinal meningitis, looking upon the

presence of the pneumococcus as merely secondary, and as frequently obscuring the presence of the diplococcus intra-cellularis.

Vigne,²⁰⁰⁰ on the other hand, from the study of an epidemic of cerebro-spinal meningitis, concludes that the disease is ordinarily associated with the pneumococcus, which is always present and frequently predominates. The organism being previously weakened by various morbid states, and especially by influenza, the affection finds conditions favorable or necessary for its development.

Righi⁵⁸⁹ Jan. 24, '95; Oct. 2, '95 reports three cases of this disease in which he found the diplococcus of Fränkel in the blood, the urine, and, in one of the cases, in the fæces. In each case the diplococcus was actively virulent and gave rise to cultures which proved active upon inoculation. The cases occurred in children of 16, 3, and 13 years, respectively, and formed part of an epidemic of the disease which occurred in Sassari. The first two patients died; the third, which was a milder case, recovered. But even in this case the diplococci were freely found in the blood and urine; so that it cannot be said that the diplococci are only associated with severe cases.

Kischevski³¹ Jan. 2, '96 made an anatomical examination in a case of cerebro-spinal meningitis following influenza, finding the lesions of vegetative endocarditis, numerous foci of pneumonia and of broncho-pneumonia, and fibrino-purulent cerebro-spinal meningitis with areas of encephalitis. The cerebro-meningeal lesions appeared to be of longer standing than those of the other organs, and it is probable that the latter were consecutive to them. Bacteriological examination of the meningeal exudate showed in the pus-cells a special diplococcus distinguished from that of Fränkel by a globular appearance and a frequent disposition in fours, by its not staining by Gram's method, and by the difficulty of causing infection in animals through its subcutaneous inoculation. It was thus the diplococcus intra-cellularis meningitis of Weichselbaum. In only one case did subcutaneous inoculation cause meningeal exudation in animals. The author asks how this diplococcus could have found entrance, and states that Scherer, who has made numerous researches on the subject, found the bacillus of meningitis in the nasal mucus in eighteen cases of meningitis, while he only found it in two healthy patients out of fifty examined for the purpose. This author believes that infection takes place through the nasal and adjoining cavities. Unfortunately this could not be ascertained in Kischevski's case.

Trambusti³⁷⁶ May 21, '96 has studied the cerebro-spinal meningitis of animals, and his researches confirm those of Foà, that the infection

occurs through milk. Foà found the encapsulated diplococcus in the milk of rabbits infected by the microbe and in the blood of young rabbits sucking this milk. The results also confirm the researches of Bozzolo, who found the pneumococcus in the milk of a nursing woman suffering from pneumonia.

According to Levillain²⁰⁰⁰ acute non-tuberculous meningitis following typhoid fever may be due to the bacillus of Eberth or to secondary infection by the bacillus coli, streptococcus, pneumococcus, and rarely the staphylococcus, without our being able to differentiate clinically between these two groups. Meningitis due to the bacillus of Eberth generally supervenes in the course of typhoid fever; exceptionally typhoid meningitis may be the first manifestation of the infection, and in this case it merits the name of cerebro- or meningo- typhus. The lesions caused in the brain by the typhoid bacillus, generally carried there by the circulation, may vary from simple œdematous congestion to the formation of purulent tracks. The symptoms are the same as those of acute simple meningitis, and the disease is entirely curable, requiring treatment varying according to the symptoms of excitation or depression, as the case may be.

Under the name of "meningism" in children F. Comby includes⁴²⁰ ²⁷ cases of pseudomeningitis, many of which closely resemble tubercular meningitis; the localization is the same, the symptoms are similar, but the nature and termination of the disease are different. Bouchut has reported two cases due to influenza; Roesch, eighteen cases; Ollivier, one of false tubercular meningitis of an hysterical nature in a little girl of 6 years. Some of these cases do not recover, and the autopsy is negative so far as tuberculosis is concerned. Comby reports four cases; the first was diagnosed as cerebro-spinal meningitis, but recovery was complete. The symptoms were in some respects so akin to pneumonia that possibly the pneumococcus may have had something to do with the causation. The second was very similar; the third and fourth were consecutive to grip. Riccardo Centi reports cases of grippal meningitis. Grip is an infectious disease giving rise to toxins which may affect the meninges. If the irritation is slight, recovery ensues; if beyond a certain limit, death.

Paul Roesch,²⁷ from his researches into this disease, draws the following conclusions: Any organism in an active state or under the influence of hysteria may cause symptoms of meningitis. Pathological anatomy fails to reveal any lesion of the meningeo-cortical zone, and the symptoms must be due to toxins secreted by the micro-organisms, whose development is favored by an infectious state in a debilitated and hyperexcitable organism. There is

a relation of cause and effect between certain intestinal troubles—such as parasites, prolonged constipation, and the presence of foreign bodies—and the appearance of “meningism.” The history of the case, the usually acute onset accompanied by convulsions, the nature of the symptoms, the brusque variations in the thermal curves, and the happy result of appropriate treatment usually point to the diagnosis. The prognosis is favorable.

H. Krammhals,³²⁶
May 10, '95 Dec. 30, '94 observed seven cases of pseudomeningitis, six fatal, and without anatomical lesions, following an epidemic of influenza.

Cornil,³
May 10, '95 describes a patient who was admitted into his wards for influenza complicated with cerebral symptoms. It was a case of encephalomeningitis, predominating in the convex part of the brain. Bacteriological examination did not reveal the presence of the influenza bacillus, though no conclusion can be drawn from its absence, as it is quite doubtful whether it ever passes into the blood.

Maleschini,³⁷⁶
No. 4, '94 has studied thirteen cases of meningitis from a bacteriological stand-point, eight of them primary and five secondary to other infections,—pneumonia, peritonitis, endocarditis, and otitis. From his researches the author believes that non-tuberculous meningitis is nearly always due to the pneumococcus. One case, that of a woman five months pregnant, seemed to demonstrate that the microbe does not always traverse the placenta and that the fœtus may escape infection, though it cannot be proven that it escapes intoxication by the soluble products of the microbe.

Franz Scherer,³⁸⁶
B.B., B.I.; June, '95 gives the histories of three cases of acute purulent leptomeningitis in nurslings of a few days to a few weeks old, occurring within a short period in Schwing's clinic in Prague. The most significant fact, however, was the finding of the colon bacillus in the purulent exudates in all three cases. The fact that the bacterium coli commune is very rarely found in meningitis, and its coincidence in these three cases occurring so closely together in the same environment, lead the author to attribute the two latter cases to indirect infection from the first case, through the mouth or external ear, by means of bathing-water used in a tub in which the first child had been bathed.

Treatment of Cerebro-Spinal Meningitis.—Aufrecht,¹¹⁶
Aug., '94; Mar., '95 242 treated a case of protracted cerebro-spinal meningitis with hot baths, the patient receiving in three days twelve baths in all, at 40° C. (104° F.) and of ten minutes' duration. Upon discontinuing the treatment nocturnal headache and delirium re-appeared, whereupon three more baths were given, after which all symp-

toms of disease vanished. Aufrecht reports this single observation to encourage the further trial of hot water. This is an old method of treatment in America, though not so well known as it deserves to be.

J. Woroschilsky, of Odessa, ¹¹⁶_{Feb., '96}; ²_{Apr. '96} recently had occasion to treat two cases of the above affection, and followed the method advocated by Aufrecht. ¹¹⁶_{Aug., '96} The results having been most satisfactory, the author gives detailed histories of the cases. The first patient had been in an acute condition for eight days, when a bath was first administered, the immersion lasting eight minutes. Sleep was induced, and when the bath was again prepared on the following day the patient was able, to a limited extent, to render assistance in reaching it. After eight daily baths the patient was practically cured and has now completely recovered. The second case also was very acute in nature, and the same treatment was followed with equally satisfactory results. The temperature of the baths throughout was 40° C. (104° F.), and their average duration ten minutes. Their apparent effect was not only to produce sleep, but to reduce the temperature, accelerate the pulse, and diminish the extensive headache.

Righi ⁵⁸⁹_{Aug. 26, '96} reports a case treated by sero-therapy. On the sixth day blood was taken from the arm of the patient's sister—who had had meningitis—and 5 cubic centimetres (1½ drachms) of the colorless, limpid serum injected into the patient. There was no reaction at the point of injection. Five hours afterward the temperature was lower, the respiration better, and the child had willingly taken nourishment. Ten hours afterward he sat up in bed and could move his head without pain. Three days after the injection the child was able to get up a little, mornings and evenings, and could walk. There was a slight return of symptoms on the seventh and ninth days, but otherwise recovery was uninterrupted, and after fifteen days there had been no return of the symptoms. Very slight strabismus and facial paralysis may still be detected. There was no albuminuria.

Subcutaneous injections of corrosive sublimate, suggested by Dazio, was successfully used by Consalvi, of Casoli, ⁹_{Jan. 15, '96} in nine cases occurring in an epidemic of influenza. The quantity of sublimate injected varied from 0.005 to 0.01 gramme ($\frac{5}{64}$ to $\frac{1}{8}$ grain) according to ages of patients, which were from 14 months to 19 years. He made at first one injection in twenty-four hours and later one in forty-eight. One case alone proved fatal, a girl of 7 dying after first showing temporary improvement after injection. In other cases vomiting ceased after the second injection, followed by disappearance of other symptoms except the muscular rigidity.

This persisted until after the sixth to eighth injection in some cases. The injections restricted the disease to a moderate intermittent fever with slight headache. The sublimate produced no disturbance except in two cases,—one, a girl of 14, had a slight attack of mercurial stomatitis after tenth injection and another, a girl of 7, a bloody diarrhoea after the fifth, but both soon passed away. Besides the sublimate, Consalvi used leeches, ice, frequent purgations with calomel, and bromide or morphine to quiet the patient. As recovery progressed he gave them iodide of potassium to expel the mercury from the system and favor the absorption of the meningitic exudations.

Tubercular Meningitis.—Schilling⁸⁴ Nov. 12, '96 discusses the possible relation of injury to tuberculous meningitis. Of course, the tubercle bacillus can be the only ultimate or direct cause, but injury may possibly prepare the way, as it would appear to do in some cases of joint and bone tuberculosis. After giving short details of recorded cases the author relates the following case: A boy, aged 9 years, fell down a cellar, after which he was unconscious and vomited repeatedly. The boy soon recovered. On the left side of the head a scar remained. Eleven days after the accident he complained of severe pain in the head and the vomiting recurred. The gait was unsteady, but there were no irritation or paralytic symptoms. About two or three weeks later there was still headache and the child lost strength. Convulsions now appeared, beginning, according to the mother, in the right face, and later becoming general. The temperature was raised at night. The symptoms seemed to point to a local lesion in connection with the injury. The convulsions became more frequent and the child more drowsy. With the idea of a focal lesion, preparations were being made for trephining, but the child died suddenly. At the necropsy there was marked evidence of tuberculous meningitis, especially at the base of the brain. No trace of the past injury to the brain could be found. The bronchial glands were caseous. As regards the relation of the injury to the meningitis, it could only result from the tubercle bacilli gaining access by the wound, or from their being dislodged in some unexplained way from the old tuberculous focus, and, in either instance, settling down in the place of least resistance produced by the injury. If the symptoms of meningitis appear two or three days after the injury, there can be no causal connection between them, but here the interval was eleven days.

A contribution to the etiology of tuberculous meningitis is made by Batamnov,⁵⁸⁶ Nov. 23, '96 who has had occasion to observe an instance of the transmission of tuberculosis in a small Russian

village. A family—consisting of father, mother, and three children—took an apartment in which a woman had died of tuberculosis. The children occupied her room, and at the end of three months the first of the sons died of acute miliary tuberculosis and the two others died within several days of tuberculous meningitis. Two other children had previously died under similar circumstances from tuberculous meningitis, and they also had occupied a bedroom in which a tuberculous person had died. The interest of the observation lies in the fact that tuberculosis is rare in this village, and that the parents, who had been for a long time known to the author, had always been healthy and presented no tubercular hereditary taint.

Rotch and Wentworth, of Boston, ⁹⁹_{Aug. 18, '96} reports a case of tubercular meningitis in a female child 3 months old. W. H. Sherman and J. S. Lambkin, of Yonkers, N. Y., ⁵⁰_{Sept. 22} report a fatal case of tubercular meningitis, in a boy aged 4 years, in which the infection seems proven to have come from some cows the milk of which he drank, in common with others of the family.

William E. Lockwood, of Baltimore, ⁵⁰_{May 25, '96} read a paper on tubercular meningitis before the American Medical Association, based on cases of his own, in some of which autopsies had been made. Of the 10 cases 7 were under bad sanitary conditions. The usual contributory causes were present,—bad air, poor diet, heredity, etc. All the families showed hereditary vices save two, the history of which could not be determined. Residence and surroundings showed bad sanitary conditions in nearly all. Experience in these cases showed him the necessity of study before making a diagnosis in children, where fever and obscure symptoms were present. Seven of the cases were negroes and three whites. Six gave histories of hereditary tuberculosis. Average duration of the disease was four weeks.

Simon, of Paris, ¹⁵²_{Mar. 29, '96} calls attention to the fact that tubercular meningitis presents no symptoms during the onset. The importance of this is indisputable. The only sign is a disharmony,—viz., an irregularity (dissociation) of the respiratory movements of the diaphragm and the thorax, which sets in during the first days of meningitis, and which can be of great assistance in detecting it, even in the most typical and insidious cases.

Huchard ¹⁴_{Dec. 16, '96} reports a case of hysterical meningism in a woman, 22 years of age, who presented all the symptoms of tuberculous meningitis without meningitis. A typical hysterical attack cleared up the diagnosis, the calmness of the patient, besides, being striking under a symptom-complex apparently quite alarming. The diagnosis leaned toward meningitis on account

of a marked dullness at the right apex and an elevated, irregular temperature. The patient had entered hospital for a common angina.

Prognosis and Treatment in Tubercular Meningitis.—The question of recovery in tuberculous meningitis has hitherto been obscured by doubt as to the diagnosis. This was not so in a case reported by Freyhan.⁶⁹_{No. 31, '94} He made a diagnostic puncture of the spinal canal in the lumbar region, and about 60 cubic centimetres (2 ounces) of slightly-turbid, pale, serous fluid spurted out. In the sediment pus-corpuscles and tubercle bacilli were found. The patient improved rapidly.

The cases reported in medical literature of apparent recovery from tubercular meningitis naturally admit of doubt, for it is well known that errors of diagnosis are very common. Fürbringer⁶⁹_{No. 31, '94} reports a case in which the diagnosis was established beyond a doubt. The case was that of a laborer, 20 years of age, who, while in the best of health, was taken with severe headache and fever. Various symptoms pointing to the central nervous system led to a diagnosis of meningitis. In order to establish the diagnosis, Fürbringer performed paracentesis of the spinal canal at the level of the second lumbar vertebra; 60 cubic centimetres (2 ounces) of a slightly-cloudy, serous fluid escaped, in the sediment of which were found a few pus-corpuscles and numerous tubercle bacilli. Contrary to all expectation, the fever subsided after the puncture, the sensorium became clear, and the headaches gradually disappeared, as well as the rigidity of the extremities and of the spinal column. Convalescence was uninterrupted.

Although, as is acknowledged,²¹_{Nov. 19, '94} the therapeutic value of the lumbar puncture introduced by Quincke, after numerous trials, still admits of doubt, the method is certainly applicable, as claimed by that journal, for diagnostic purposes, and the more so that tubercular meningitis often takes the cerebro-spinal form.

According to R. Hirschberg,⁶⁷_{Nov. 16, '94} ²⁴²_{Mar., '95} death in cases of tubercular meningitis is caused not by the development of the tubercles, but by intra-cranial compression, by cerebral asphyxia. The rational treatment of the disease lies, therefore, in trephining and drainage,—procedures similar to those employed with good results in tubercular peritonitis. The operation should, however, be performed before coma sets in. Ord and Waterhouse report a case of tubercular meningitis, in a child 5 years old, in which trepanation of the occiput was done six weeks after the onset of the disease. The dura and arachnoid were divided, and a probe and drainage-tube introduced between the cerebellum and the medulla oblongata. The drainage was followed by an amelioration of the

severe symptoms. In spite of the fact that the tube was kept *in situ* for seventeen days and an intercurrent attack of measles developed, the child got well.

A. E. Austin, of Dorchester, Mass., ⁹⁹_{Dec. 27, '94}, also states that the ultimate cause of death is not the studding of the meninges with tubercle, but the pressure on the brain resulting from fluid induced by these. Hence, relief of pressure might procure a chance for recovery.

Cerebral Syphilis.

Frank P. Norbury, of Jacksonville, Ill., ⁹⁹_{Jan. 21, '95}, in a paper on the mental symptoms of cerebral syphilis, draws the following conclusions: 1. Somnambulism and allied states, lapses of intelligent conceptions, with associated loss of memory. 2. Sudden somnolence, with ocular spasm or paralysis; when preceded by headache and monoplegia it is almost pathognomonic. Headache, quasi-periodical, as defined by Gray, with marked insomnia, suddenly ceasing and followed by psychical disturbance, is due to syphilis. 3. Melancholia or mania, when following periodical headaches, insomnia, or somnolence, is to be classified thus: (a) With ocular spasm or other form of monoplegia or heterogenous paralysis, it is due to syphilis. (b) Pseudoparanoia. By this he means that cases presenting all the symptoms of paranoia—systematized delusions depending on hallucinations of sight, hearing, taste, or smell, with slight impairment of general mental functions—are due to syphilis; as we know that syphilis causes isolated local losses of power, and it is noteworthy, when the special senses are involved, that mental derangement usually results. (c) Pseudoparesis, characterized by fibrillary tremor of tongue, indistinct speech (partial or complete aphasia), uncertain and trembling gait with delusions of grandeur, and occasional outbursts of maniacal excitement, pupillary involvement, all characteristic symptoms of paresis, but which yield readily to antisymphilitic treatment, may be said to be due to syphilis. 4. Epileptiform and apoplectiform attacks. We find cases in which treatment was undertaken too late. The symptoms are those of terminal dementia, only occurring in patients of previously sound mental condition and with no special hereditary history.

In a case of intra-cranial syphilis seen by Diller, of Pittsburgh, there were present ⁹⁹_{Jan. 19, '95} nearly all the symptoms pointed out by Gray (mental and nervous diseases), consisting of severe headaches with marked periodicity, convulsions, somnolence, psychical symptoms; stupor with headache, so to speak, protruding through it; cranial-nerve palsies (one of which was complete) of slow onset, numbness, and conjugate deviation of the eyes.

Jacobson,³¹⁹_{Mar. 1, '96} reports a case of multiple paralysis of the cranial nerves caused by syphilis. The patient, a man aged 29, began to cough three months after the appearance of a hard chancre. Three months later signs of cavities were discovered in the lungs, and the patient began to expectorate freely a greenish sputa, which, however, contained no bacilli. After about four weeks trigeminal neuralgia and double facial paralysis appeared, which yielded to antisyphilitic treatment. The condition of the lungs grew worse, and the author remained undecided as to whether the pulmonary lesions were of a syphilitic nature.

Roget,²²⁸_{Dec. 16, '96} reports a case of premature cerebral syphilis, resulting in death five months after the appearance of a chancre, in a man aged 42 years. Rosa Engelmann,¹¹⁷⁰_{Nov. '96} reports a case of cerebral syphilis in a child 10 months old. Maieff,⁸¹_{Jan. 16, '96} reports a case of stuttering, of syphilitic origin, in a man 25 years of age. The case is interesting from the fact that, according to Sikorski, no case of stuttering acquired after the age of 17 years has as yet been observed.

Leo Steiglitz,⁴⁴_{July, '96} publishes a paper which presents in practical form a very fair *résumé* of the accepted diagnostic data of syphilis. He advocates the use of both mercury and iodide, giving preference to the latter drug and in sufficiently large doses.

C. E. Nammack,²⁴²_{July, '96} reported a case in which the diagnosis was an intra-cranial gumma, localized in the lower part of the pons on the left side. For two weeks the patient had received inunctions of blue ointment and 60 grains (4 grammes) of iodide of potassium thrice daily, the improvement being remarkable.

Bruni,⁹²¹_{May 11, '96; June 8, '96} in a case of cerebral syphilis, treated the patient at first with intra-muscular injections of mercury and potassic iodide by the mouth. As there was no improvement by the seventh day 0.003 gramme ($\frac{3}{84}$ grain) of corrosive sublimate in solution was injected into the left median cephalic vein, after Baccelli's method. This was repeated on the following day, and the dose was steadily increased up to 0.006 gramme ($\frac{6}{84}$ grain). In all, sixteen intra-venous injections were given. From considerations of convenience, mercurial inunction was then adopted. Good reports of the patient were received for some time after.

Mannaberg,⁵⁷_{Nov. 11, '96} reports two cases of cured cerebral syphilis. After five subcutaneous injections of a 2-per-cent. sublimate solution, sight, which had been partly lost, began to improve, the hyperæsthesia diminished, and in three months the patient left the hospital in a fairly satisfactory condition. It is probable that in this case there were diffused lesions of the central nervous system. The second patient was a woman, 33 years old, suffering from

total paralysis of the right common oculo-motor. Mercurial friction giving no results, sublimate injections were used and brought about considerable improvement.

Disseminated Sclerosis.—Oppenheim⁴_{Mar. 1, '94} contributes an elaborate article upon this subject. Discussing the etiology he attributes much importance to the relationship of the infectious diseases, among which malaria and influenza should be included. Intoxication by lead, phosphorus, and other chemical and metallic poisons are also occasional factors. Krafft-Ebing is quoted as attaching much importance to exposure to cold as a cause. Oppenheim believes, with most observers, that the disease quite often begins in childhood, though he believes the developed disease to be rare under adult age. The periods of remission and exacerbation are separated by many years in some cases. Other etiological factors of much importance are trauma and congenital predisposition; but of all causes metallic poisons appeared most prominent in the series of cases observed by him,—twenty-eight in number, in eleven of which there was a history of occupation involving the use of lead, phosphorus, or other similar poisons. Pathologically he had found, at the autopsy in one of his cases, a diffuse inflammatory process which had begun about the vessels of the white and gray matter, and had caused ascending and descending degeneration. In another case, in which the tremor and spastic paresis were limited for many years to one-half of the body, the autopsy showed slight changes in the cord and a patch of sclerosis occupying almost the entire corpus callosum. The disease may begin, he believes, as an encephalitis pontis. The diagnosis is often difficult. In one patient a disturbance of sight, which occurred during the fourteenth year, marked the beginning of the disease and remained as the only symptom for twenty years.

O. Huber⁶_{Sept. 29, '95} had occasion to examine the central nervous system in a case of this disease. The examination seemed to indicate that the disease consists essentially in a parenchymatous degeneration of the nervous tissue. In recently-affected spots especially there was wide-spread disappearance of the nerve-fibres without any greater change in the interstitial substance than could be accounted for by the changes secondary to the disappearance of the fibres; so that the sclerotic patches must, in this case, at least, be regarded as due to the disappearance of the nerve-fibres.

A case of sclerosis in plaques in a child of 10 years is recorded by Drouet,¹¹³⁹_{Nov. 22, '94} and two cases due to influenza by H. Rendu,⁹²⁰_{Dec. 31, '94} who believes that the sclerous encephalitis was consecutive to an infectious circumscribed arteritis. An interesting atypical case is described by Theodore Diller, of Pittsburgh.¹_{May 24, '95}

DISEASES OF THE SPINAL CORD.

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General Considerations.

[IN no field of pathology are the results of anatomical and physiological researches in more intimate relation with observations at the bedside than in diseases of the spinal cord. Knowledge of the anatomy of the spinal cord necessitates pathologico-anatomical examination; and the same is true of the diseases of the spinal cord, a correct understanding of which can only be acquired through a thorough theoretical knowledge of the organ. As, however, an account of the progress made in the anatomy and physiology of the spinal cord finds a place in another chapter, we must limit ourselves to the consideration of such work as bears on the more theoretical questions, but which also aim at a clinical result.—H. O.]

K. Schaffer, of Budapest, ⁷⁵_{May 1, '95} examined the spinal cord of a young girl who had died five months after a transverse lesion, and found that the several fasciculi involved, both in an upward and a downward direction, did not present the same degree of degeneration. He therefore concluded that this process of degeneration varies as to the time required to produce the changes in the different columns, and he endeavored to solve the question by experiments on cats. The results demonstrated that in transverse lesions of the spinal cord the columns of Goll and Loewenthal (descending marginal fascicle and intermediate lateral fascicle) are the first to undergo degeneration (on the fourth day), the lateral cerebellar tract follows (on the sixth day), while the pyramidal tracts are involved much later (twelfth day). The evolution of the secondary degeneration therefore takes place within the same proportionate limits of time as the medullary sheath.

The changes occurring in the spinal cord after amputation have been studied in five cases by Grigoriew. ⁴⁰⁵_{v. 15, '95} These changes were always found in the corresponding enlargement, and in direct relation, as to intensity, with the time that had elapsed since the amputation: thus, in one case, in which the amputation had been

performed only one year before, no change could be found. The condition resulting is always a simple atrophy of the elements of the cord, especially pronounced in the sensory regions; the ganglionic cells are the last to atrophy.

Wille, of Basel, ³⁶⁸_{v.27, '96} observed slight changes in Burdach's column in three cases of amputation of the upper arm, with diminution of the corresponding cells in the anterior horn.

Heiden ²¹⁰¹_{'94} describes a spinal cord with abnormal configuration of the gray substance and other malformations, without, however, being able to demonstrate that these were not artificial post-mortem changes.

Williamson, of Manchester, ⁹⁰_{Dec., '94} has made researches with the view of determining how far the diseases of the spinal cord are dependent upon the distribution of the blood-vessels in this organ and upon their diseased conditions. There can be no doubt that cerebral affections are much more frequently the result of vascular lesions than are diseases of the spinal cord, and this is due chiefly to the differences in the vascular supply and distribution in these two parts of the nervous system. He also calls to mind the fact that the lower portion of the spinal cord is but sparingly supplied with blood. In acute anterior poliomyelitis it is just this region of one or more anterior arterial fissures which becomes diseased, while, on the contrary, the field of degeneration in hereditary ataxia (Friedreich's disease) corresponds with the region of the peripheral arteries of the spinal cord (vasocorona).

A further distinction may also be made with regard to the arteries of the spinal cord, since we enumerate an anterior and a posterior arterial system. In many cases of combined sclerosis the sclerotic region rather closely corresponds with the posterior arterial system.

In many spinal diseases, primary disease of the vessels or, at least, their participation in the trouble must be assumed; as, for instance, in disseminated sclerosis, transverse myelitis, hæmorrhage, thrombosis, syphilitic myelitis, etc.

A considerable number of papers give important additional evidence concerning the structure of the spinal cord, obtained through careful study of secondary degenerations. Sougues, of Paris, ¹⁴_{May 29, '96} was able to exactly define the region of the seventh cervical nerves in the funiculus cuneatus of Burdach. Dejerine and Sottas, of Paris, ⁹²⁷_{June 9, '96} observed ascending degeneration in the anterior and lateral pyramidal tracts in the case of a patient who had lived for thirty years with a transverse myelitis. There was thus a degeneration extending toward the trophic centre,—a centripetal, cellulipetal degeneration, which, in contradistinction to the

well-known form of Waller, is also called retrograde degeneration. Durante, of Paris, ²¹⁰²₇₆ has also made an extensive study of secondary degenerations, particularly the retrograde variety, and has contributed articles, which are united in his new work. ²¹⁰²₇₆ The researches of Fajersztajn, of Lemberg, ⁷⁵_{Aug. 16, '96} may also be noted here. It has been attempted by the aid of the newer methods, and often with good results, to find abnormal changes in the elements of the nervous system, which, with the methods practiced before the present time, must necessarily have escaped notice. Sarbo, of Pesth, ⁷⁵_{Aug. 1, '96} studied the changes in the nerve-cells of the spinal cord after transitory occlusion of the abdominal aorta. Rachford, of Cincinnati, ²⁷_{May, '96} also studied these changes consequent upon reflex irritation.

[It must not be forgotten, however, that, in the majority, if not in all, nervous affections, even when a material anatomical basis can be established, there is, nevertheless, a certain proportion of more or less pronounced symptoms which must be regarded as purely functional. We shall have occasion to again refer to this point later on.—H. O.]

Sanger Brown, of Cincinnati, ⁶¹_{Feb. 14, '96} demonstrates the importance of functional nervous diseases and gives an account of an interesting case.

[It may also be stated that several important works have been devoted to the consideration of diseases of the spinal cord in general; I may mention those of Leyden and Goldscheider, of Berlin, ²¹⁰³_{P. 1} and Byrom Bramwell, of Edinburgh.—H. O.]

Myelitis.

[The question as to the infectious nature, in the most comprehensive sense of the word, of the various forms of myelitis, is a very important one, and it was therefore made the subject of extensive references and discussions at the French Congress for Internal Medicine at Bordeaux in 1895.—H. O.]

Grasset, ¹⁴_{Aug. 11, '96} in opening up the discussion, presented the following propositions, in which he disregards syphilis and tuberculosis as infectious factors: 1. It appears to be established as a certainty that an intimate relation exists between the various infections and the separate forms of myelitis (chronic and acute, diffuse and systematic); nevertheless, in certain cases, the verification of such an etiological relation depends upon post-mortem proofs. 2. It would appear that all infections, in their various stages of development, may give rise to disease of the spinal cord. 3. Although any of the various types of myelitis may be induced by infection, the acute and chronic diffuse forms occur most fre-

quently, according as there exists one circumscribed centre or many of them. 4. The clinical course of infectious myelitis is independent of the nature of the infecting agent. The type of the disease therefore depends more upon the localization in the spinal cord than upon the nature of the infection. 5. It remains undetermined whether the microbes act directly or through their toxins upon the spinal cord. 6. At all events, the etiology of infectious myelitis is a complicated one; the combined action of the infection and of an inherited or acquired nervous predisposition is required for the development of the affection. 7. The diagnosis, prognosis, and the treatment of infectious myelitis are dependent upon the previously-enumerated conditions.

The second speaker, Vaillard, took up the subject from the stand-point of experimental and comparative pathology. His conclusions differ upon several points from those of Grasset. The myelitis may occur long after the infection, but always in an acute or subacute form. Certain infectious agents are much more liable to cause paralysis than others. The lesion of the spinal cord in these cases is always parenchymatous and affects most particularly the ganglionic cells of the anterior horns. Alterations in the nerve-fibres only occur later on, and it is impossible to say whether they are the result of a primary or a secondary degeneration. The neuroglia mostly remains unaffected, and changes in the vessels do not occur.

[Upon this last point Vaillard differs from many of the later authorities; in a considerable number of cases, at least, a primary degeneration independent of circulatory disturbances can scarcely be admitted.—H. O.]

Vidal and Bezançon, of Paris, ¹⁴_{Jan. 30, '96} inoculated 116 rabbits with streptococcal cultures of various degrees of virulence. In 7 cases (6 per cent.) paralysis manifested itself in from seven days to two months, always ending fatally. In 4 cases there was paraplegia, flaccid in character; in 3, paraplegia associated with contractures. In 2 of the rabbits the contractures were general, affecting the four extremities and the muscles of the trunk and head. Examination of the spinal cord showed that the nerve-cells of the anterior horns had undergone extensive alteration of various kinds; the lateral and posterior columns showed degenerations, and, above all, pronounced vascular lesions, even hæmorrhages. No streptococci were to be found in the spinal cord.

Oettinger, ²²_{Feb. 9, '96} in contradistinction to the case just quoted, gives an account of an acute myelitis, resembling Landry's paralysis, in a patient suffering from small-pox. At the autopsy the spinal cord was found to be softened in its dorsal portion, and the pres-

ence of a quantity of streptococci was discovered by bacteriological examination.

Referring further to the proceedings at the congress at Bordeaux, ¹⁴_{Aug. 11, '98} it should be stated that a lengthy and very interesting discussion followed the reading of the papers of Grasset and Vailard. Crocq, of Brussels, stated that he had made experiments with the diphtheria bacillus, and that the spinal cord and the nerves were particularly affected, the bulb less so, and the brain not at all. Henriquez and Hallion, of Paris, stated that they had produced alterations in the spinal cord in dogs and in a monkey by injections of diphtheria toxin; in the latter animal anterior poliomyelitis was found in the lumbar portion of the cord. Ballet and Lebon, of Paris, had injected cultures of the pneumococcus and streptococcus, and Ausset, of Lille, the blood of a woman suffering from puerperal infection. Streptococci were used by Mossé, of Toulouse; Sabrazès and Mongour, of Bordeaux; Roger and Babés, of Bucharest. The latter also gives an account of the various influences exerted by the different varieties of micro-organisms upon the spinal cord. The microbes may penetrate into the spinal cord through the lymph- or blood- vessels. In leprosy the bacillus may penetrate directly into the body of the nerve-cells without occasioning any changes in the surrounding regions, while in hydrophobia, for instance, inflammatory centres and excessive alterations in the blood-vessels are induced. In infectious myelitis the microbes may frequently be found upon cultivation.

Walter, of Cracow, ⁵⁸⁰_{Feb. 19, '94} describes the case of a man who presented the symptoms of transverse myelitis two weeks after having been bitten by a suspected mad dog. Recovery followed.

Three cases of acute diffuse myelitis following infection are reported by Tanrelli-Salimbeni, of Siena, ²¹⁰⁴_{Series 4, v. 5} in two of which the micrococci could very easily be distinguished in the spinal cord. Evans ⁶_{Sept. 23, '94} describes a case, with the results of the autopsy; and A. Hall, of Sheffield, ²²_{Feb. 4, '98} reports another, ending in recovery, in a girl 12 years old.

Notwithstanding the frequency of ocular disturbances in chronic affections of the spinal cord, they are rarely met with in acute cases. The case of Devic, of Lyons, ²⁰⁷⁵_{'94} is noteworthy, being one of bilateral optical atrophy in a woman, 45 years old, suffering from acute myelitis.

Williamson, of Manchester, ⁶_{Aug. 21, '98} who has given great attention to the relation of the vascular distribution in the spinal cord to the diseases of this organ, describes a case in which there was softening of the lower portions of the cord limited to that portion of the transverse section supplied by the posterior spinal arteries.

Referring to compression myelitis consequent upon caries of the vertebræ, which form of myelitis must be strictly relegated to another class than the infectious and similar varieties, Chipault makes some interesting remarks, based upon a case under his observation. It is generally admitted that the symptoms of Pott's disease present themselves very rapidly when vertebral affections have previously been diagnosed, and that, on the contrary, they develop very slowly when the alterations in the bones are of such a nature that they cannot well be recognized. However, in some cases in which the vertebræ have, to all appearances, remained sound, a sudden onset of the spinal-cord symptoms may be noted.

[In considering the pathogeny of compression myelitis the more recent experimentalists incline more and more to the opinion that the changes met with in the spinal cord in this affection are not the direct results of pressure occasioned by the diseased vertebræ, but are rather produced indirectly by œdema of the cord.—H. O.]

K. Lechlenthner, of Ebersberg, ²¹⁰⁵ observed two cases of compression myelitis in which pressure was unmistakably exerted upon the cord by the affected vertebræ. The histological conditions, however, were of such a nature that they could hardly be explained by this pressure. Most probably the degenerations were already developed in the cord before the mechanical pressure was established.

Pfeiffer, of Bonn, ¹⁰⁰⁵ gives the results of anatomical examinations of two cases of acute myelitis. In the first case acute inflammatory processes could be demonstrated upon the vessels of the thickened pia mater, principally affecting the veins. In the second case there was disseminated multiple myelitis. The work of Barrié ²⁰⁰⁰ on blennorrhagic meningomyelitis is most important. In a case seen by him there occurred, several days after gonorrhœal infection, increasing pains in the legs, œdema, afterward paraplegia with paralysis of the sphincters, and absence of reflexes; death took place in one month. Meningomyelitis was noted in the lumbar portion of the cord, the pia mater being very much more affected than the cord itself. The bacteriological examination did not reveal gonococci in the vertebral canal, but some streptococci, the virulence of which was no doubt greatly increased by the simultaneous gonorrhœal infection.

Anterior Poliomyelitis.

The most complete study of this subject, accompanied by a number of new cases, is that of J. B. Charcot, of Paris. ²¹⁰⁶ He is opposed to the opinion, advanced by others, that progressive muscu-

lar atrophy—Duchenne-Aran type—is not a disease *sui generis*, and believes, notwithstanding the relatively rare post-mortem results, that it occurs much more frequently than is believed, and that there may also be a subacute form. Only recently Hammond, of New York, ¹_{Jan. 4, '96} stated that the affection undergoes a transition ending in unlimited amyotrophic lateral sclerosis.

[Charcot identifies anterior poliomyelitis with spinal muscular atrophy, and this justly; in both the anatomical results are the same and the clinical differences are unimportant, as all the intermediate varieties may present themselves.—H. O.]

Orcel and Stourme ¹⁵²_{Jan. 4, '96} describe a case which they designate as a subacute form of progressive spinal paralysis consequent upon auto-intoxication. Kiefer ²⁰⁸⁸_{'94} reports a case of the chronic variety, carefully examined anatomically, in an hæmophilic patient of 54 years of age. Two other cases, with post-mortem results, are reported by Dejerine, ⁹²⁷_{Mar. 22, '96} and one without an autopsy by Armstrong. ⁸¹⁴_{Sept. 1, '96}

[The literature concerning spinal paralysis in children is naturally rather more extensive. The case reported by M. Radtke, of Pustchow, ²¹⁰⁷_{'95} is less interesting from a clinical stand-point than from the fact that the patient, having reached the age of 31 years, is still able, notwithstanding the very pronounced atrophy and paresis of the lower extremities, to move about with the aid of the hands, and also to work a sewing-machine, in doing which she adroitly uses the very limited power of motion in the legs.—H. O.]

Frank Fischer, of San Francisco, ¹⁴⁷_{Oct. '94} gives a comprehensive review of the etiology of infantile spinal paralysis. Boys are more frequently affected than girls (5 to 4); the youngest child affected was 3 months old; the majority of cases occur during the second year, and the disease most frequently appears during the warm season, toward autumn; heredity and tuberculosis do not seem to have any etiological importance, though this opinion is advanced by some. Trauma exerts a certain influence, through spinal commotion, and the author also considers dentition as an important factor. The first place must, however, probably be accorded to an infectious process.

Caille ⁴⁶²_{July, '96} presented two children, of which one was suffering from a typical spinal paralysis; in the other there was probably some process in the motor region of the cerebrum.

C. Schilling, of Munich, ²¹⁰⁵_{'95} gives the result of a minute examination of the spinal cord in a man, 30 years old, who had suffered during twenty years from infantile spinal paralysis.

Trevelyan, of Leeds, ²_{Sept. 22, '94} after the anatomical examination of a cord, also concludes that the pathological changes were such

as to suggest the notion of an interstitial and vascular origin of the disease as against a parenchymatous one, and Allen Starr⁵⁹_{Dec. 1, '94} expresses the same opinion.

Two important contributions concerning the hereditary, or family, form of muscular atrophy have been made,—one by Marinesco, of Paris,⁴⁵⁷_{Nov. 1, '94} who states that the disease, which mostly begins in the lower extremities (peroneal type), is characterized anatomically as follows: Besides the changes in the muscles proliferation of the interstitial connective tissue occurs, together with the destruction of the nerve-fibres in the peripheral nerves; in the spinal cord there is degeneration of the posterior columns and of the anterior and posterior horns.

Werdniz, of Gratz,³⁶⁸_{v. 28, '94} describes as “early infantile progressive spinal amyotrophy” a disease presenting the following symptoms: Several children of the same family become affected, very gradually, during their first year. Beginning in the thighs and pelvic muscles the disease progresses centrifugally. Pseudohypertrophy does not occur, nor are there bulbar symptoms, fibrillary twitchings, lordosis, or disturbances of sensibility. The affection takes a rather rapid course. The anterior horns and anterior roots are greatly degenerated, while the posterior roots and the white substance of the cord appear normal. In the nerves of the lower extremities there are many and in those of the upper ones few disintegrated nerve-fibres, with no interstitial proliferation. The anatomical results are thus quite different from those in Marinesco’s case.

Dana, of New York,¹_{Dec. 29, '94} described an epidemic of anterior poliomyelitis in Rutland, Vermont. From July 25 to September 1, 1894, there were about 160 cases, which were at first supposed to be cerebro-spinal meningitis. Adults and children were both affected, and even horses and birds were not spared. The spinal cord of a hen was examined and changes were found similar to those in anterior poliomyelitis. Andrew Macphall, of Montreal,⁹_{Dec. 1, '94} also wrote concerning the same epidemic. The majority of cases were in children. Twenty-five per cent. were cured, 30 per cent. improved, 32 per cent. remained without improvement, and 13 per cent. died. In most cases (forty-five times) both legs were paralyzed; twenty times the left only; seven times the right only; eight times the left arm and left leg; three times the right arm and right leg, etc. Although considerable doubt prevailed as to the true nature of the disease, its acceptance as poliomyelitis seems to be generally justified. There was the initial feverishness, aching pains, abrupt paralysis of the nature commonly known as “infantile,” and with a highly characteristic distribution. If it were not

for the disturbance of the vagus one would have no hesitation, upon clinical grounds, in pronouncing the epidemic one of poliomyelitis. The mode of onset, the age of the patients, the season in which the epidemic occurred, the distribution of the paralysis, and the subsequent behavior of the muscles, all point to this disease.

Heyberger, of Freiburg,²⁰⁸⁸ recommends the early use of electrotherapy in the treatment of infantile spinal paralysis and cites the case of a girl, 4 years old, who was completely cured by this method.

De Forest Willard and Guy Hinsdale, of Philadelphia,¹¹² give exact indications for surgical treatment of infantile anterior poliomyelitis. Well-timed intervention arrests the development of deformities.

Attention has been repeatedly directed to the re-appearance of peculiar symptoms, indicative of a morbid process in the nervous system, which had apparently died out (*réveil des affections anciennes*). Pauly, of Lyons,²¹⁰⁸ has made this the subject of an extensive monograph. In almost all cases persons who have suffered from infantile spinal paralysis show, later on, the symptoms of acute or chronic myelitis, with paralysis and muscular atrophy, principally poliomyelitis. The twenty-four cases collected by the author were all, with one exception, of the male sex, which may possibly be accounted for by the fact that the working-man is more subject to the outward influence of cold, overexertion, etc. The time which may elapse between the existence of the infantile spinal paralysis and its "re-awakening" varies greatly, sometimes reaching forty years; the average is an interval of from fifteen to twenty years. Cold, fatigue, privation, trauma, etc., are considered as predisposing influences. The pathogeny of this affection is still obscure.

[That the symptoms of spinal disease presenting themselves in later years bear some causal relation to those existing during childhood seems undoubted, but the manner of this relationship has not yet been elucidated. The opinion that the old focus of the disease may at the same time act as a foreign body and thus form a *locus minoris resistentiæ* is in some ways justifiable. Others accept the theory of a resuscitation of the old infection or the occurrence of a new one. It may also be possible that a combination of several such factors exists in certain cases.—H. O.]

Syphilitic pseudoparalysis (*maladie de Parrot*) may sometimes bear a certain resemblance to infantile spinal paralysis. Syphilitic pseudoparalysis, which has formed a subject of study for Gonez,²⁰⁰⁰ is always occasioned peripherally and is characterized

by paralysis of the extremities or cutaneous disturbances of sensibility, with pains in the bones. The following points may be enumerated as differentiating it from infantile spinal paralysis: Appearance of the disease in children of syphilitic parents at a very early age, most frequently during the second month; no febrile onset, no muscular atrophy, increased faradic excitability, and pain in the bones.

Syphilis of the Spinal Cord.

Syphilitic myelitis (meningomyelitis syphilitica, syphilitic spinal paralysis) has also been a subject of great interest to physicians of late, and in consequence several comprehensive communications have been presented, as, for instance, those of Sottas, of Paris ¹⁰⁰_{Dec.22,'94}; Lamy, of Paris ⁹⁴_{Dec., '94}; Lebrun, ⁴⁵⁴_{Mar., '95}; Scalfatti, ⁵⁸⁹_{Jan.14,'95} and Krütze, of Gera. ²¹⁰⁹_{'95}

Sottas again refers especially, as in former articles, to the acute form of syphilis of the spinal cord, which appears to be by no means rare. The symptoms may appear in a sudden apoplectic-form manner; pronounced softening of the cord (myelomalacia) will then be found.

The case cited by MacGregor, of Glasgow, ²_{Mar.2,'95} in which there was no softening, may be mentioned here. Lamy has elaborated his formerly-expressed theories concerning the participation of the vessels in the development of syphilitic meningomyelitis, and has established them experimentally by forming artificial embolisms of the spinal arteries. Krütze briefly cites fifteen new cases of syphilitic affections of the spinal cord, and remarks that upon a syphilitic basis it is not invariably the type of Erb's syphilitic spinal paralysis which is presented, but occasionally also a typical transverse myelitis. The communication of Trachtenberg, of Cracow, ¹¹⁴_{v.35,'95} upon this subject is also very complete. He recognizes Erb's syphilitic spinal paralysis as an independent disease, and to the well-known symptoms thereof (augmented tendon reflexes upon relatively slight muscular tension, paralysis of the bladder, slight sensory disturbances, but little pain, and no muscular atrophy) he adds that of heightened thermal reflexes in the lower extremities (Kowalewsky's symptom) and also calls attention to the fact that the transmission of the sensations of pain and of touch is not retarded; disturbances of the pupils may also, contrary to the opinion of Erb, occur. He places syphilitic spinal paralysis and other toxic affections of the spinal cord (lathyrismus, pellagra) upon a parallel, and reports nineteen personal cases.

Illustrative articles have been furnished by F. Smith, of London ²²_{Dec.12,'94}; McCall Anderson, of Glasgow ²¹³_{Aug., '95}; Meese, of

Munich, ²¹⁰⁵₉₆ and E. Wilhelm. ²¹¹⁰₉₆ The latter reports three new cases, of which one ended fatally. The microscopical examination showed diffuse (syphilitic) alterations in the vessels, particularly in the regions of the posterior and lateral columns; the changes in the nerve-substance were regarded as secondary.

A. Böttiger, of Halle, ³⁶⁸₉₆ concludes that it is as yet impossible to determine, from the macro- or micro- scopical results in spinal myelomeningitis, whether we have to deal with tuberculosis or syphilis (when no bacilli of tuberculosis are found). The alterations in the vessels, which are important in syphilitic myelomeningitis, do not present any special characteristics, but occur in the same way in all other varieties of acute and chronic processes. In the cases in which gummata are met with in the substance of the spinal cord, the changes in the meninges may be so slight that Böttiger considers them as merely secondary. In the peracute cases of myelitis following syphilis, in which during a period of several hours a more or less complete paraplegia of the lower extremities, with vesical and rectal troubles and disturbances of sensibility, present themselves (to which Sottas calls particular attention), the author also considers that there is no question of a primary meningitis, but that the process originates in the substance of the spinal cord.

Upon a sufficient consideration of the time elapsing between the beginning of the disease and the infection, the primary symptoms, and the subsequent mode of progress in all its details, it is usually possible to distinguish between syphilitic myelitis, meningo-myelitis (in the more limited sense), and gummata of the spinal cord. This differentiation is not only of theoretical, but of practical value, since in myelitis antisyphilitic treatment will yield but scanty results; the prognosis is more satisfactory in meningo-myelitis, and antisyphilitic treatment gives the best results in cases of syphilitic tumors.

The fact that syphilitic disease of the spinal cord may also present a decided deviation from the usual course is shown by the case of Olivier and Halipré, of Rouen, ¹⁰⁹⁰_{Aug. 30, '96} which presented the characteristics of amyotrophic lateral sclerosis.

[Syphilitic pseudoparalysis has already been mentioned in the section on anterior poliomyelitis.—H. O.]

Disease of the Spinal Cord in Pernicious Anæmia.

Lichtheim first called attention in 1887 to the fact that spinal symptoms may present themselves in the course of pernicious anæmia, and that they are occasioned by anatomical changes in the spinal cord. Two years ago Nouné, of Hamburg, gave par-

ticular attention to this subject, and now, in a new and comprehensive work, ¹⁰⁰⁵ he treats of a number of important questions in this connection, basing his opinions upon the results of seventeen cases. It is constantly being more and more clearly demonstrated that diseases of the spinal cord and the changes in the blood do not stand in the relation of cause and effect, but that they both are co-ordinate successive symptoms of one and the same—up to the present time unknown—injurious influence, and that therefore the degree of the nervous affection is not necessarily proportionate to the degree of the anæmia. In pernicious anæmia any of the spinal symptoms observed in tabes may be present or absent; so that in no one case has the entire symptom-complex of tabes been met with. On the other hand, symptoms entirely foreign to tabes may also occur, for instance, in the lateral columns. The anatomical condition is also peculiar. Centres of acute myelitis are found which present themselves in any portion of the white substance, preferably, however, in the posterior columns; the gray substance, the zone of Lissauer, and the intermedullary roots remain unaffected. The process is a descending one, inasmuch as the cervical cord is earlier and more severely affected than the lower portions of the cord.

Among the 17 cases were 2 with positively negative anatomical results and 5 cases in which they were doubtful. It should be mentioned, however, that the author did not make use of Marchi's staining method, which is so extremely useful in the first stages of degeneration of the nervous system. In 3 cases the changes in the spinal cord, though only just beginning, were unmistakable, and in 7 of the cases these changes were pronounced and more or less advanced.

The centres of disease in the spinal cord are neither symmetrical nor confined to the columns, or "systems." It is to be supposed that the changes in the white substance are only induced by disease of the vessels, and that their appearance depends upon the distribution of the diseased vessels. As a matter of fact, the vessels were invariably abnormal in the typical cases; the walls were thickened and periarteritic proliferation was also present. The severity of the symptoms with regard to the spinal cord stands in no direct relation to the intensity of the anatomical changes.

Another case coinciding entirely with that of Nouné, with the exception that changes in the vessels could not be demonstrated, is reported by Arning, of Hamburg. ²⁰⁸¹

Ch. W. Burr, of Philadelphia, ¹¹² cites 7 cases of pernicious anæmia, 1 of pronounced anæmia after dysentery, and 1 of ataxic paraplegia occurring in a phthisical subject with intense anæmia.

These 9 cases are briefly described, together with the anatomical conditions in the spinal cord, which were negative only once. The localization of the centres was found by the author to be the same as that given by others,—Noune, for instance. Burr was not able to convince himself of a primary disease of the vessels, and, therefore, supposed a primary and, possibly, toxic affection of the nerve-fibres. He further calls attention to the fact that the spinal symptoms may frequently be overlooked, owing to the marked preponderance of those of the anæmia. It also happens, not very rarely, that patients present themselves complaining of dyspeptic troubles, weakness, numbness and tingling in the extremities, and slight difficulty in walking and in using the hands, and on examination there is found more or less ataxia, absence of knee-jerk, and, possibly, diminished sensation, but not the other signs of tabes. Blood-examination will often show marked anæmia and give the clue to the real trouble.

Bowman⁴⁷_{Summer, '94} reports the case of a woman, 53 years old, ailing about three years and suffering from weakness of two months' standing. No ataxia was present, but the patient was unable to walk; there was slight decrease of tactile sensibility; the reflexes were retained; the red blood-corpuscles numbered 19.5 per cent.; hæmoglobin contained in the blood, 20 per cent. A decided improvement resulted from the administration of arsenic; so that the patient was again able to walk. The following year the condition became greatly aggravated; there were ataxia, contractions of the lower extremities, incontinence; red corpuscles, 12 per cent. The anatomical condition found was similar to that in combined systemic disease, and the author considers that this was a case of disease of the nerve-tissue consequent upon anæmia.

Among the three cases of pernicious anæmia with spinal-cord symptoms reported by Angel Money²⁶⁷_{June 16, '96} is one of a young physician, 25 years old, ending fatally after several weeks.

W. Müller, of Berlin,²¹¹⁰_{'96} calls attention to the fact that changes in the spinal cord, similar to those met with in pernicious anæmia, may occur in a variety of other diseases, combined with general cachexia and marasmus, such as Addison's disease, diabetes mellitus, and leukæmia. In a case of the latter disease a slight sclerosis of the posterior column, increasing from below upward, was found, with a great loss of nerve-fibres.

Insular Sclerosis.

A series of important lectures upon insular sclerosis were delivered by Redlich, of Vienna, at the meeting of the Society of Psychiatry and Neurology.⁸_{Dec. 5, 10, '96} Anatomically, several processes

may be found: either there is a pronounced thickening of the neuroglial tissue, containing the remains of the nerve-fibres, above all, of bare axis-cylinders, or it will be found that, with a relatively slight alteration in the neuroglial tissue, the nerve-fibres are missing, in which case a fine, thin net-work exists. It does not, therefore, appear to him to be at all certain that the process originates as an inflammatory one in the vessels, or that the neuroglial proliferation is the primary factor; he considers that we should be more correct in accepting a degenerative process, particularly affecting the nerve-fibres. He accounts for the intention tremor by a functional weakness of the nerve-apparatus; it is true that the anatomical process interferes with the precise function, but there is no actual anatomical localization for this symptom. He places nystagmus upon a parallel with the intention tremor, it also having no anatomical localization. Scanning speech is most likely referable to the sclerotic areas in the pons and in the medulla oblongata (its favorite location); speech must naturally be first to suffer from areas of sclerosis in the bulb, since it requires the finest innervation, being the most complicated of the physiological processes. He gives a series of symptoms in insular sclerosis which may be termed functional, since they have no recognized anatomical basis; on the other hand, sclerotic foci may be found in this disease which have given rise to no symptoms.

Huber²⁰_{v.10} also concludes that in certain cases, at least, a primary degenerative process of the nerve-elements is to be accepted which only secondarily results in neuroglial proliferation.

Bikeles, of Vienna,²¹¹_{v.3} directs attention to the fact that even in very old cases of insular sclerosis recent nerve-degenerations are sometimes met with, either in the border-zone of larger and older sclerotic foci or in the form of entirely new foci. The not unusual acute relapses occurring in this affection are thus explainable. According to the varying location of the foci, the symptoms of insular sclerosis may also be, to a certain degree, variable, and the majority of the classical symptoms of the affection may be absent.

Buzzard, of London,²_{Jan. 13, '96} is therefore of the opinion that, in all cases in which paresis of one or of several extremities disappears only to re-appear much later on, insular sclerosis must be suspected. He reports five cases (all without post-mortem results) of which four followed an atypical course.

Diller, of Pittsburgh,¹_{May 25, '96} describes a case which he considers one of atypical insular sclerosis. The most important symptoms were the general weakness and emaciation, the clumsy shuffling gait, the exaggerated reflexes, the presence of ankle-clonus, the

protrusion of the eyeballs and internal strabismus, the slight speech affection, and the mental impairment. The tremor was not an intention tremor, but there were often persistent intervals of repose. As the patient, a young man of 21, was obliged to inhale the vapors of lead and mercury, the possibility of metallic poisoning suggests itself. In view of the other symptoms present, as well as the absence of many characteristics of metallic poisoning, insular sclerosis seems most plausible. In some instances the latter affection begins with a rapidly increasing paraplegia, as in acute myelitis. Two such cases, with autopsies, were observed by Pitres, of Bordeaux.³_{no. 57, '94} In a third case a similar condition of paraplegia presented itself twice, followed by improvement in both instances. The author is, consequently, of the opinion that this was also a case of insular sclerosis.

McCall Anderson²¹³_{Feb., '96} describes a case following syphilitic infection which he considers as one of insular sclerosis. Improvement took place after antisyphilitic treatment.

Insular sclerosis appeared about two months after an attack of influenza, with hemiplegia on the right side, in a man, 32 years old, seen by Rendu,⁵⁵_{no. 12, '94} who believes that here the hysterical functional symptoms appeared in connection with the organic disease.

[We may, as a matter of course, accept the fact that in each separate case of organic disease of the spinal cord there is a certain proportion, sometimes very great, of symptoms which are to be regarded as functional; the improvement occasioned by hypnotic suggestion in these cases is thus explained.—H. O.]

Hamilton Osgood, of Boston,⁹⁹_{July 11, '96} reports several instructive examples of such cases.

Amescht⁹⁵⁴_{v. 24, no. 1, 1895} cites the case of a European who had lived in India for seven years, and who lately began to suffer from a decided trembling of the entire body, which disappeared while in repose, only to re-appear upon any intention of movement, as well as upon psychical excitement. Although the other well-known symptoms of insular sclerosis are absent, the author considers himself justified in establishing this diagnosis.

Amyotrophic Lateral Sclerosis.

[Certain disputed points concerning amyotrophic lateral sclerosis are yet awaiting solution, especially since Senator last year expressed the opinion that this affection is not a disease of the spinal cord *sui generis*, but rather a variety of progressive muscular atrophy. The repeated attempts made of late to demonstrate that the entire psychomotor tract, from the cerebral cortex to the muscle,

is directly affected by the disease are most important in this connection. Two neurons are thus involved,—the first extending from the cells of the cerebral cortex to within the gray substance of the spinal cord, the second from the anterior-horn cell to the muscle.—H. O.]

Mott, of London, ⁴⁷_{Spring No., '96} cites, in connection with this point, an interesting case with a particularly complete post-mortem examination. The patient was a woman, aged 39, who died in Charing Cross Hospital from the disease, which commenced in an unusual manner, affecting first the right leg, then the right arm, then the left leg and left arm, terminating within one year in bulbar paralysis and death. A careful microscopical examination of the entire central nervous system distinctly showed changes throughout the motor tracts. In the cortex of the central convolutions there was degeneration of the nerve-cells and nerve-fibres; the latter could be traced through the inner capsule of the ventral portion of the cerebral peduncle and the pyramids into the lateral and crossed pyramidal tracts. There was atrophy of the nuclei hypoglossi, facialis, and accessorii, atrophy of the anterior horns in the spinal cord, with disappearance of the anterior and internal groups of nerve-cells, and to a less degree atrophy of the posterior and external groups. In many of the peripheral nerves there was also pronounced degeneration. It will thus be seen that the whole motor tract showed signs of degeneration; and Mott considers that a simultaneous degeneration of the upper and lower motor neurons took place. If, for instance, the second one, the peripheral neuron (from the anterior-horn cell to the muscles), had alone been affected, we should have had the type of a spinal muscular atrophy. In amyotrophic lateral sclerosis the cortico-spinal neuron is, as a rule, less severely affected than the spino-muscular. This was so in the case reported by Goldscheider, of Berlin, ³⁰⁰_{Feb., '96} in which the degeneration could scarcely be followed farther than into the inner capsule.

Collins, of New York, discussed, at the meeting of the American Neurological Association, ²¹¹²_{'96} two cases of typical amyotrophic sclerosis with post-mortem results. Other cases, without autopsies, have been described by Lewin, of Berlin ²¹¹⁰_{'96}; McCall Anderson, of Glasgow, ²¹³_{Feb., '96} and Barr, of Liverpool. ¹⁸⁷_{Jan., '96}

In a woman 70 years old, Rauzier, of Montpellier, ¹⁴_{Nov. 21, '94} observed, besides the symptoms of amyotrophic lateral sclerosis, which had begun eight years before, dementia and a peculiar disturbance of speech (stammering and aphasia). The autopsy showed, in the spinal cord, the condition of amyotrophic lateral sclerosis and, in the brain, upon the left frontal lobe, a wide-spread porencephalitis.

[This furnishes a fine example of the superposition of two different nervous diseases in the same individual, the one, the congenital affection, having no doubt prepared the field for the other.—H. O.]

The case reported by R. Mackenzie ³⁶_{Aug., '96} shows how the progress of amyotrophic lateral sclerosis (particularly when bulbar symptoms are already present) may be hastened by an attack of influenza and rapidly brought to a fatal ending.

While the aforementioned case of Rauzier was noteworthy on account of the advanced age of the patient (70 years), that of W. Krauss, of Buffalo, ⁹_{July 20, '96} also refers to a man, 68 years old, in whom the disease began in the form of paralysis agitans without tremor, muscular atrophy and exaggeration of the tendon reflexes only appearing later. An autopsy was, unfortunately, not made.

The fact that the symptoms of amyotrophic lateral sclerosis may also be simulated by quite another disease is illustrated by the case of Ballet, of Paris, ³_{Nov. 11, '94} in which—most probably upon a syphilitic basis—two foci were developed in both cerebral hemispheres (pseudobulbar paralysis), giving rise to the symptoms of amyotrophic lateral sclerosis. In the case of Olivier and Halipré, of Rouen, ¹⁰⁰⁰_{Aug. 20, '96} the patient was likewise a syphilitic, and presented the symptoms of amyotrophic lateral sclerosis, with certain deviations from the usual type. The careful examination of the spinal cord, however, disclosed changes of an entirely different character, most closely resembling those occurring in combined tabes (Friedreich's disease, or spastic hereditary paralysis) and most probably of vascular origin.

[The form of amyotrophic lateral sclerosis in which there are, besides the degeneration of both motor neurons, alterations in the posterior columns must be regarded as a special variety of rare occurrence. Clinically it manifests itself principally by disturbances of sensibility.—H. O.]

A case of this kind, carefully observed, both clinically and anatomically, has been described by Hektoen, of Chicago. ²⁴²_{Mar., '96} It may be regarded as a combination of amyotrophic lateral sclerosis and tabes. At the age of 62 the patient began to suffer from weakness and an unsteady gait; then weakness and wasting of the arms were noticeable, with spastic paresis and increasing muscular atrophy, particularly in the muscles of the hand. The reflexes were augmented, and there were also bulbar symptoms, difficult speech and deglutition, paresis of the tongue, etc. Three years after the onset of the symptoms there was anæsthesia in the extremities, complete in the ulnar area. Transmission of sensation of pain was retarded, incontinence developed, and death occurred

four and a half years after the beginning of the malady. The anatomical examination disclosed degeneration in the pyramidal tracts, from the cerebral cortex to the medulla, with atrophy of the nuclei in the bulb and the anterior-horn cells. Besides these anatomical changes there were others of similar nature, though less pronounced, in the direct sensory neuron,—i.e., changes in the cells of the spinal ganglia, degeneration in the posterior spinal-nerve roots and in Goll's columns, also in the trigeminal sensory roots. There may also have been a slight degeneration of the cells in Clarke's columns, but there was none in the fibres of the lateral cerebellar tract.

Acute Ascending Paralysis (Landry's Paralysis).

The knowledge concerning this rather rare affection is, as yet, rather limited. Zusch, of Grossbreitenbach,²¹⁰⁹ makes an excellent contribution to the entire question. After a comprehensive historical *résumé* he evolves the following conclusions, based upon the entire literature of the subject and three personal cases: Landry's paralysis must no doubt be considered as an acute intoxication paralysis. Concerning the nature of the cause we have so far no fixed indications; however, it does not appear to be a single factor. In the majority of cases the initial point of the lesion appears to be in the peripheral nervous system; so that the greater number of cases of Landry's paralysis are to be included in the category of acute polyneuritis. This is the neuritic form of the affection, which is clinically characterized by more severe pains and anomalies of electrical excitability. More rarely the lesion causes metastatic disease in the spinal cord, and particularly in the medulla oblongata; we then have the myelitic, or bulbar, form of the disease, in which pain and pronounced changes in the electrical excitability are absent, and in which the reflexes should remain normal in the paralyzed members. Paralysis of the pharynx and facial paresis as initial symptoms are especially characteristic of the bulbar variety. As in other toxic paralyses, mixed forms occur in which the peripheral and central nervous systems are simultaneously affected. It may also happen that no changes in the nervous system are demonstrable, that merely functional disturbances occur,—the true toxic form of Landry's paralysis.

Of the three cases observed by Zusch, the first was cured after five months, the second somewhat sooner, and the third ended fatally. The examination of the spinal cord seems to have been made only macroscopically, but changes in the coloring of the white substance were evident, which would indicate an acute myelitic process. This last case is also of interest through the

fact that the paralysis (Landry's) seemed to be the sudden outcome of a very advanced stage of chronic alcoholic poisoning, in a person of neuropathic tendency, and ended in death from heart-failure.

Oettinger and Marinesco, of Paris, ³₁₈₉₃ have reached almost identical conclusions. They observed a case of Landry's paralysis occurring after variola, which ended fatally after a few days. The peripheral nerves appeared normal. A vascular and perivascular engorgement was very pronounced in the vessels of the spinal cord, with mono- and poly- nuclear leucocytes, of which many were filled with streptococci. The alterations in the nerve-cells of the spinal cord were striking; the body of the cells seemed swollen, cloudy, and vacuoles were present. The prolongations were often torn or broken off. Around the nerve-cells, and occasionally in them, streptococci were found. This case was one of the true myelitic form of Landry's paralysis, but Vranjican, of Zara, ⁸_{July 11, 1905} describes another in which, possibly, a certain etiological relation with an unusually severe epidemic of malaria could be established. The ischiatic nerves were at certain points hypertrophied to six times the normal size.

Spastic Spinal Paralysis and Little's Disease.

Raynaud, of Paris, ¹⁴_{Feb. 3, 1905} in exhibiting a brother and sister who presented the symptoms of spastic infantile paralysis (Little's disease), referred to the relation of the infantile form of this disease to the spastic spinal paralysis of adults, and also to the pathogeny of the symptoms. He believes that it is incorrect to refer the contractures and augmentation of the tendon-reflexes to a diseased condition of the pyramidal tracts. The symptoms, in the two children described, did not, as is usual in typical cases of Little's disease, present themselves soon after birth, but only several years later, and the affection therefore was an intermediate form between true Little's disease and the family form of spinal paralysis; the two forms are, however, of the same nature and present the same type.

Erb, of Heidelberg, ¹⁰⁰⁵_{7.6} rather inclines to the opinion that degeneration of the pyramidal tracts (or, more properly speaking, of the lateral columns) is the primary cause of the well-known symptoms of this affection.

[The question, however, remains as to whether this condition in itself is not due to a defective action of the trophic cells in the brain (*i.e.*, of the entire cortico-spinal motor neuron) and is not, therefore, secondary in nature. The author saw two little sisters (whose parents and grandparents were relatives) in whom the

disease likewise only presented itself in the fourth year of their life.—H. O.]

Ganghofner, of Prague, ²¹¹³₉₄ was unable to find any changes in the pyramidal tracts in congenital rigidity of the limbs, and consequently infers an impaired function of the cerebral cortex.

Koschevnikoff, of Charkow, ⁵⁷¹_{Nov. 4, '96} also had under observation two sisters in whom the symptoms of progressive spastic diplegia began to develop in the seventh year. He is forced to admit, however, that the significance and pathogenesis of this disease have not yet been made clear, and that a variety of disease processes may be in question.

In the case of Benedikt, of Vienna, ¹¹³_{Nov. 13, 14, '96} the symptoms only presented themselves in the fifteenth year. The author does not consider the case as one either of spastic spinal paralysis or of Little's disease, although there was a great similarity to both of these affections. The principal symptom, as in both above-named varieties, was hypertension of the joints. He brings forward this case to again emphasize his opinion that it is a regrettable error to suppose that the tracts for the transmission of motor and will impulses are located in the pyramids; it should rather be said that the pyramidal tracts govern the innervation of the joint tension.

[He alone supports this opinion!—H. O.]

Verhoogen, of Brussels, ⁸⁸⁸_{Jan. 12, '96} presents the case of a girl, 5 years old, in whom the symptoms were noticeable during the first months of life, though they only became unmistakable when she should have begun to walk. He refers the disease, in this case, to a very pronounced anæmia, even dangerous to life, in the mother, which set in during the seventh month of pregnancy, after uncontrollable epistaxis. He believes that the development of the pyramidal tracts was thereby interfered with.

Fournier and Gilles de la Tourette, of Paris, ⁴⁵²_{Jan., Feb., '96} saw two children in whom the symptoms were referable to hereditary syphilis. They were able by antisyphilitic treatment, particularly by mercurial inunctions, to effect a considerable improvement, the stiffness becoming decidedly less. In the case of Breton ¹⁰⁰_{Dec. 25, '94} the development of Little's disease was likewise unmistakably due to hereditary syphilis.

[It would naturally be erroneous to accept this as the cause of all cases of this malady, but it is advisable, particularly in view of the eventual therapeutic result, to institute inquiries as to whether there may not be hereditary syphilis.—H. O.]

Two cases of spastic spinal paralysis in adults are reported by H. Hofmeister, of Marktbreit. ²⁰¹⁵_{'94} In the first the initial

symptoms presented themselves after overexertion and taking cold, and the second after a confinement.

[At all events, we are not yet in a position to form a very clear picture of this affection; in the first place, a suitable series of post-mortem results are still missing.—H. O.]

Hæmatomyelia and Hæmatorrhachis.

Lambert, of Lille,¹⁴_{Sept. 11, '96} cites the case of a man who, after a fall, had both lower limbs paralyzed, with anæsthesia up to the level of the nipples, loss of patellar reflexes, and retention of urine. As the patient was otherwise strong, trephining of the vertebral column was decided upon for the following day. The man, however, died unexpectedly during the night. At the height of the third or fifth dorsal vertebra an extra-dural hæmorrhage was found which had compressed the spinal cord and prevented the return-flow of the blood from the deeper regions of this organ. It is therefore likely that an operation would have saved the patient.

E. Lad, of Zirndorf²¹¹⁴_{Aug. 11, '96} gives a comprehensive account of this disease, and again calls attention to the fact that in hæmorrhages of the spinal cord the known dissociation of the sensibility of the skin will be met with, as in syringomyelia.

[This symptom is referable to the same localization of the disease in the posterior horn; the hæmorrhages and likewise the cavities of syringomyelia are mostly met with at this point.—H. O.]

A case of hæmatomyelia, without post-mortem results, consequent upon the lifting of heavy loads, is described by Marinesco and Van der Stricht.⁶⁸⁴_{Aug. 11, '96}

Tumors of the Spinal Cord.

We are indebted to the labors of Allen Starr, of New York, for a large collection of material of the greatest interest.⁵_{June, '96} Since we are now in a position to indicate the location of a tumor in the vertebral canal with a considerable degree of certainty, and since, on the other hand, the progress made in surgery enables us to operate with every chance of a good result, the consideration of this subject becomes of the greatest importance. Starr has collected from the literature of the last ten years 123 cases of tumors of the spinal cord, together with 22 cases in which the seat of the trouble was correctly diagnosed and operative measures resorted to (among these were 6 personal cases). In only 2 cases have surgeons failed to find the tumor sought for. In 1 only was it impossible to remove it when found. In 11 cases the patients died soon after the operation, and in 11 cases they recovered after

surgical interference. The operation has been followed by recovery from the condition of paraplegia in 6 cases. A description of the 6 personal cases given by Starr may be summarized as follows:—

Case 1. Carcinoma of the right cervical region in a woman, 46 years old, with carcinoma of the liver. Death. Autopsy, without opening the vertebral canal.

Case 2. Gumma of the lower cervical cord in a man of 40 years. Under the use of iodine and mercury slight improvement after two weeks. Paralytic condition improved by electricity. Very marked improvement after five months.

Case 3. Sarcoma of the dorsal region, extra-dural, and surrounding almost the entire spinal cord. The tumor was extirpated; the patient recovered from the operation during the first few days, but there was no improvement in the paraplegia. Seventeen days after the operation he died of heart-failure, without any other apparent cause.

Case 4. Soft tumor, extending from the first lumbar nerve to the conus medullaris and filling the entire dural sac. The patient died suddenly after more than two years' duration of the disease.

Case 5. Woman, 50 years old, with a lipomatous tumor in the region of the tenth dorsal vertebra and a second one below the eleventh (extra-dural), both of which were extirpated. The patient recovered from the operation, but only a very slight improvement resulted; vesical incontinence and the girdle sensation had disappeared. As the condition again began to grow worse, it was supposed that there might be other lipomata higher up. The vertebral canal was again opened about two months later, but no tumor was found. Under the left lower scapular angle, however, a fluctuating tumor was observed. Upon incision of the same a large quantity of pus was voided, and the cavity of the abscess could be penetrated as far as the carious sixth vertebral body. After this operation all the symptoms relative to the spinal cord improved greatly and very quickly. The patient, however, died of marasmus three and one-half months later.

Case 6. In a young girl of 17, of a tuberculous family, an extra-dural tubercle was found in the upper lumbar cord and removed. Decided general improvement. After several weeks the symptoms again presented themselves with all their former violence. A second operation was undertaken, but this time all the tissues were found so infiltrated by the tuberculous mass that the removal of the same was out of the question. The girl died several months later.

One of the most important differential symptoms in tumors of the spinal cord is the pain, which begins early and is always confined to the region of the compressed nerve-roots. At first it is unilateral, but later on becomes symmetrical and is then always bilateral, when the compression of the spinal cord has caused symptoms of paralysis. It is important, in distinguishing from neuralgia and neuritis, to note that no sensation of pain is experienced in the course of the nerves in question. The symptoms referable to compression of the spinal cord by the tumor usually present themselves in a certain consecutive order, as follows: Increase of reflex activity in the segments below the point of compression, paralysis, loss of sensibility, loss of reflex activity. The fact that the favorite seat of spinal tumors is in the dorsal region is also useful in establishing a diagnosis. All the above-named indications only serve, as a matter of course, in the case of extra-medullary tumors. In such tumors as have their seat in the substance of the spinal cord proper Brown-Séquard's semi-lateral paralysis is present from the first, atrophy of the muscles begins early, with the reaction of degeneration in the nerves, later on trophic disturbances, bed-sores; analgesia generally precedes anæsthesia.

In conclusion Starr gives several hints concerning the performance of the operation. It is, for instance, advisable to open the dura mater very slowly, making rather a small puncture at first, so that the flowing out of the cerebro-spinal fluid does not take place too quickly.

Fischer and Van Gieson, of New York, ²⁴²_{No. 1, '96} report a case of extra-medullary gliosarcoma reaching from the region of the second lumbar nerves into the cauda equina. The patient had complained of increasing weakness in the legs, with diminution of sensibility; he died in a condition of marasmus. The diagnosis of tumor of the vertebral canal could not be established during life. An interesting case of tubercle of the upper cervical cord was presented by Schlesinger, of Vienna, at the Society for Psychiatry and Neurology, November 12, 1895, which will be published in detail later on. The fact is especially noteworthy that the tubercle, which almost entirely filled the transverse section, had given rise to symptoms greatly resembling those of bulbar syringomyelitis. For the truly bulbar symptoms there was no other anatomical basis than œdema of the unusually large medulla oblongata.

Chiari, of Prague, ⁸_{No. 4, '94} cited several cases of tubercle in the spinal cord progressing with but very few symptoms.

Gerlach, of Berlin, ⁴_{No. 2, '96} describes a tubercle, the size of a

cherry, in the cervical spinal cord; and Gerhard, of Berlin,⁸⁰⁹ also mentions a case of tubercle of the cervical spinal cord and one with several cysticerci in the spinal cord.

Multiple spindle-cell sarcomata (probably metastases from the kidney) in the spinal cord and the nerves of the cauda equina are described by Müller, of Augsburg.²¹⁰⁵

Szekères, of Gross Kanisza,⁶²² reports the following case: A butcher had for twelve years a swelling in the middle of his back, which had not given rise to pain or any other symptom. A year before the time of report symptoms of compression of the spine had been noticeable, finally ending in complete paraplegia. The swelling, which proved to be an echinococcal sac, was opened from the outside. Complete recovery followed.

Kümmel²¹¹⁵ reported a sarcoma of the upper dorsal region, two centimetres long. This was extirpated and sensibility and mobility gradually returned; so that the man was able to resume his work.

As intra-spinal tumors are relatively rare they always awaken considerable interest, notwithstanding the infrequency of recovery. A number of such cases are, therefore, quoted. Le Bœuf, of Brussels,⁸⁶⁸ reports a case of tubercle, developing within the space of several weeks, in the upper cervical cord. The principal symptoms on the part of the nervous system were paresis on the right side, atrophy of the interossei and diminution of sensibility in the right half of the body, exaggeration of the patellar reflexes, slightly spastic gait, nystagmus, and dilatation of the right pupil. The tumor was 2.6 millimetres wide and measured 4.5 millimetres in a dorso-ventral direction, and involved principally the gray substance, particularly on the right side. The author calls attention to the fact that the tumor occupied just that portion in which the changes are likewise noticeable in syringomyelia, and, in fact, several symptoms of syringomyelia were present. It cannot, moreover, be denied that once a tubercle becomes thus softened in substance, like a glioma, it gives rise to the formation of a genuine cavity (syringomyelia).

Holt and Herter, of New York,²⁴² report a diffuse glioma in a boy 1 year old. The neoplasm had affected almost the entire spinal cord, but the symptoms were comparatively slight in proportion to the extent of the tumor. The most striking one was paralysis of the upper extremities.

Williamson, of Manchester,² found a small syphilitic gumma in the left lateral pyramidal tract, at about the mid-dorsal region; it also involved the outer part of the intermediate gray matter and neck of the posterior horn. Around the gumma was a

zone of myelitis, and slight changes extended to the opposite side of the cord. At first there was pain in the mid-dorsal region for about nine weeks, then numbness of both legs, and paresis up to the point of complete paraplegia. Anæsthesia developed on the right side in the abdomen and leg, in the left leg, and there was slight diminution of sensibility.

Sanger and Krause³⁴_{Nov. 22, '91} operated upon an extra-dural sarcoma, twenty-seven millimetres long, at the level of the sixth dorsal vertebra, which had developed after a trauma. The patient died four days later of bronchitis and hypostatic pneumonia.

A case of multiple sarcomatosis of the cerebral and spinal meninges observed by Westphal³⁰⁸_{v. 36} is worthy of mention. The symptoms were headache, dizziness, nausea, cramps, retarded pulse, failure of patellar reflexes, and sensation of pressure upon the vertebral canal. The patient was a young girl of 15. Arachnitis sarcomatosis basilaris and spinalis was found. The entire arachnoides of the spinal cord were infiltrated, particularly in the posterior portions and above the dorsal cord.

Epitheliomata of the spinal dura mater are rather rare. Michell Clark, of Bristol,⁴⁷_{Summer and Autumn Nos., '96} observed this condition in the dura cervicalis. It is worthy of mention that, during the very slow progress of the disease, a decided aggravation occurred after a fall; also, that pain was absent, while the sensory symptoms presented a great similarity to those observed in syringomyelitis. The diagnosis of an intra-spinal tumor was, however, correct, and an operation was undertaken which could only be partially carried out, owing to the great weakness of the patient, who died during the following night.

Röttger, of Bergede,²¹¹⁴ reports two cases of sarcoma of the dura spinalis. The communication of A. Pick, of Prague,⁸⁸_{No. 40, '96} is of anatomo-pathological interest and concerns two cases in which he found myomata upon the inner spinal meninges developing from the muscular fibres of the arteries. True neurons of the spinal cord are anatomo-pathological rarities. Schlesinger²¹¹¹_{v. 1} found these three times, always in otherwise diseased spinal cords. As another very rare form of disease we may mention infiltrated tuberculosis of the spinal cord, of which a case has been clinically and anatomically described, under the name of nodular tuberculosis of the spinal cord, by Haskovec, of Prague.⁸⁴_{Sept., '96}

A concise, and yet complete, *résumé* of the knowledge of tumors of the spinal cord has been made by Bruns, of Hanover.²¹¹⁶_{v. 1}

Owing to the fact that at present operative measures seem

to afford the only chance of recovery in many cases of brain-tumors, and that such operations can only be resorted to after a positive diagnosis, the question of exact local diagnosis is being studied with special care. Bruns says that a careful observation of the successive symptoms, from the very beginning of the trouble, is an important aid in facilitating the diagnosis. That of tumor of the spinal meninges is most probably correct when the symptoms of total compression of the spinal cord are developed slowly during one to two years,—first in the form of a unilateral root-lesion, afterward of unilateral and, finally, of bilateral medullary lesions. The presence of tumors in other portions of the body adds greater certainty to the diagnosis. For the local diagnosis of a tumor and the precisising of its segmental level the upper portion alone is usually considered. With this object in view the sensory and motor symptoms occurring highest up should be sought for and, in turn, referred to the highest segments of the spinal cord with which they stand in relation or to the roots immediately after leaving the cord, the corresponding spina dorsalis to which this segment (or root) corresponds being then determined. Very frequently the anatomo-physiological relations are not sufficiently considered and trephining is practiced too deeply. Bruns concludes that, in every case in which a tumor of the spinal cord has been diagnosed with certainty, it is the physician's duty not alone to advise an operation, but to insist upon it.

Syringomyelia.

Our attention may well be first devoted to the book of H. Schlesinger, of Vienna,²¹¹⁷ which forms the first complete monograph upon this subject, treating, as it does, of the entire and rich literature and based throughout upon personal experience. The clinical description comprises about fifty personally-observed cases. The author proves that anomalies of the muscular sinus are frequent in syringomyelia, and also describes several, as yet unknown, disturbances of the sense of pressure. The principal affections in syringomyelia seem to be here for the first time arranged and described upon dermatological principles. Naturally great attention is devoted to diseases of the joints. Symptoms arising from the bulbus medullæ oblongatæ are much more frequent than has generally been accepted, Schlesinger being able to demonstrate them in about one-third of his cases. Paralysis of the muscles of the eyes and changes in the innervation of the larynx in this disease are described in a most comprehensive and exhaustive manner. The clinical peculiarities of two hitherto-unknown types (lumbar, humero-scapular) are given with precision. The anatomical por-

tion is based upon the examination of seventeen personal cases, with about 6000 preparations. The author concludes that in syringomyelia the wall is very often partially covered with central canal epithelium, and that true syringomyelia and hydromyelia merely represent the end-members of an anatomical series. The importance of the blood-vessels in the origin of the central cavity is also dwelt upon; there are, of course, varieties which only occur in consequence of anomalies of the vessels, but in the majority of cases disease of the vessels plays a co-ordinate rôle to that of the central gliosis.

Schlesinger²¹¹ has also studied the changes occurring in the posterior columns, and finds that they are very frequently present, either as caused directly by syringomyelia or as chance complications. The diseased conditions of the posterior columns caused by syringomyelia affect principally that section which in tabes either remains entirely free or longest unaffected. It also differs from tabes, inasmuch as the latter is a parenchymatous disease of the nerve-tissue, while syringomyelia is an interstitial affection.

Very interesting communications concerning syringomyelia have been made by F. Schultze, of Bonn.²¹³ In one case the diagnosis of this affection could not be established during the life of the patient, since there was at the same time a cerebral tumor the symptoms of which were most prominent. Dizziness, vomiting, choked optic disc, unilateral weakness of the nervous abducens, general pains, but no distinct local symptoms were noted. At the autopsy a glioma of the corpus callosum was found, also syringomyelia in the dorsal portion of the spinal cord, extending upward very slightly into the cervical cord.

A condition discovered by Schultze, in a child born with asphyxia from a very difficult confinement and which died shortly after, presents a certain indirect relation to syringomyelia. There were numerous slight hæmorrhages in the posterior horns of the spinal cord and a more pronounced hæmorrhage in the medulla oblongata, which occupied precisely the situation in which the fissure is always found in bulbar syringomyelia. It would, therefore appear best, in all cases of bulbar syringomyelia, to inquire whether there may not also have been a very difficult birth.

With regard to the pathogeny of syringomyelia, the case of K. Straub, of Munich,²¹⁵ is of importance, having received careful anatomical examination by the author. It should be noted that the symptoms of pneumonia with which the patient, a woman of 59 years, died were in nowise such as to lead to the supposition of the presence of an enormous cavity in the spinal cord, extending from the upper lumbar cord into the medulla oblongata; in the

thoracic and cervical portions the cord represented merely a cylinder with thin walls, the internal side of which was smooth and shining. The microscopical examination demonstrated that the cavity was lined almost throughout with an epithelial layer. Straub is, therefore, of the opinion that there was, in this case, a steadily-progressing softening of the central canal consequent upon an abnormal transudation caused by chronic vascular engorgement. A predisposition to this condition may have existed through congenital hydromyelia; the transudation in the central canal was perhaps facilitated by direct secretory activity of the epithelium of the central canal. The scoliosis may be held responsible for the vascular engorgement which was demonstrated under the microscope in the dilated, coiled-up veins in the spinal cord.

Ernst Berndl²¹¹⁸₇₄ reports eleven new cases, of which only one was accompanied by autopsy. In the case cited by Richstein, of Munich, ²¹⁰⁵₇₆ syringomyelia was the result of a trauma.

Dejerine and Mirallié, of Paris, ⁹²⁷_{Mar. 9, '76} report a case of unilateral facial atrophy in syringomyelitis. The left side of the face seemed very much atrophied, especially the bones; the teeth on this side were either missing or decayed. There was myosis on the left. The secretion of perspiration was suppressed on the hemiatrophic side, even after the injection of pilocarpine, and the temperature was diminished on the same side. If we admit a condition of paralysis of the left sympathetic nerve as the main factor, this would, however, not explain the low temperature, nor the atrophy of the bones occurring so late in life. In the discussion Chauveau and Laborde remarked that vaso-paralysis, after section of the sympathetic, not only disappears with the lapse of time, but may even change suddenly, and Dupuy stated that he had also seen twice, in full-grown animals, unilateral atrophy of the facial bones after this operation. Bochrach, of Philadelphia, ⁹_{Apr. 20, '76} saw pronounced unilateral atrophy of the muscles, particularly those of the hand and forearm, but also those of the back and lower extremities, in a colored boy, 16 years old, who presented unmistakable symptoms of unilateral (right-sided) syringomyelia.

In the spinal cord of a man who had during life shown the symptoms of syringomyelia Müller and Meder¹¹⁴₂₃ found a cavity formation, which was, however, not due to neuroglial proliferation, but to primary softening processes, which were clearly caused by degeneration of the blood-vessels. The seat of the disease was the gray substance and the surrounding portion of the posterior columns.

Lévi and Lavineau⁹²⁶_{Apr. 4, '76} were able to observe, in a case of

syringomyelia (without autopsy), the Argyll-Robertson symptom, together with myosis; it therefore remains doubtful whether this was an atypical case of syringomyelia or a combination with tabes dorsalis.

[Compare with Raymond's case. ¹⁰⁰ May 10, '96 —H. O.]

The arthropathies, which like other trophic disturbances may occur in syringomyelia and in tabes, will mostly be considered in the section on the latter affection. The case of the patient presented before the Clinical Society of London, ² Mar. 2, '96, in whom perforating ulcers successively appeared upon both feet, together with other symptoms of syringomyelia, should find a place here.

The bulbar symptoms occurring in the disease under consideration are of particular interest through the fact that they are much more dangerous to the life of the patient than the spinal symptoms. We have already mentioned that Schlesinger treats in detail of this group of symptoms in his monograph. Lamarq ⁹² Apr. '96 has also made these symptoms the subject of particular study. The first bulbar symptom is anæsthesia of the trigeminal nerve. Occasionally the bulbar symptoms present long periods of remission, and may, indeed, disappear entirely. Raymond, of Paris, describes ³¹⁹ July, '96 the case of a woman, 58 years old, in whom the bulbar symptoms were especially prominent: hemiatrophy of the tongue, pupillary differences, narrowing of the field of vision, nystagmus, diminished sensibility of the soft palate, epiglottis and larynx, difficulty in swallowing, and atrophy of the left vocal cord.

In a girl, 15 years old, observed by Horst ²⁰³¹ the first symptom of the disease, paralysis of the left arm, had appeared suddenly two years before. Later on the patient burnt her hands without feeling it, there were pains in the left side of the chest, slowly-developing scoliosis, atrophy of the left arm (Aran-Duchenne type), and diminished secretion of perspiration in the left half of the face.

Sometimes contraction of the field of vision occurs during the course of syringomyelia, frequently, but not always, of hysterical nature. Krämer, of Munich, ²¹⁰⁵ saw three such cases. He has also noticed that in many instances a pronounced degree of contraction corresponds with the side of the body primarily affected.

[A whole series of cases, which are as yet classed as atypical, go to prove that there are really a number of different forms in which syringomyelia presents itself, just as the anatomical condition is also a very variable one. A difference in the various forms already consists in the fact that each of the principal symptoms of syringomyelia—muscular atrophy, dissociation of sensibility, and trophic disturbances—may be developed to such a preponderat-

ing extent as to give a specific character to the case. For instance, in the case of J. Targowla, of Paris, ⁴⁵²_{May, June, '96} the trophic disturbances in the joints occupy, by far, the first place, while all the other symptoms are of minor importance; the first-named conditions also appeared long before the other symptoms.—H. O.]

Hatschek, of Vienna, ⁸⁴_{Nov. 19-20, '96} has observed a number of cases, although he only describes three, in which the conditions presented certain peculiarities, which bring them under the head of atypical cases. The first case was decidedly unilateral in character, and was for a long time supposed to be one of hysteria, the more so, since at that time there was no atrophy and tactile sensibility had been lost. Trophic disturbances were also absent. At the autopsy a gliomatous mass was found in the lower portion of the medulla oblongata extending downward through the entire cord, particularly in the posterior portion and in the posterior column. The second case would appear to belong to the scapulo-humeral type of syringomyelia, although the disturbances in the bulbar nerves, particularly of the larynx, which are so often met with in this form of syringomyelia, were not present.

[Compare farther on with Schlesinger.—H. O.]

This case is furthermore interesting from the fact that it developed after a trauma, the man having fallen upon his back on a slippery pavement, but being able to walk home with assistance. A central neuroglial proliferation may probably be accepted as having been set up by the trauma. Hæmatomyelia should, no doubt, be excluded, as the symptoms only develop slowly and not immediately following the injury. In the third case the syringomyelia was combined with pseudoleucocythæmia. Hyperæsthesia and hyperalgesia extended throughout the entire left half of the body, including the region of the trigeminus. A cavity was found in the spinal cord as far as the lumbar portion, which was widest at the top; in the medulla oblongata fissure formations were observed in the typical regions on the left side, having occasioned, among other changes, a disturbance in the fibres of the pyramids, resulting in ascending degeneration. A bilateral degeneration of the pyramids, very difficult to explain, was also met with. Another striking feature was the fact that the clinical symptoms were not entirely explained by the conditions observed at the autopsy, since, while the former were limited almost entirely to the left side, the anatomical process had involved the whole of the gray substance, although the posterior horn was more markedly affected on the left than on the right side.

Schlesinger, of Vienna, ⁷⁵_{Aug. 1, '96} has given detailed accounts of the scapulo-humeral type so often referred to. This is characterized

by the beginning of the atrophy in the muscular region of the shoulder-girdle, with torsion of the scapula, pronounced kyphosis, late appearance of disturbances of sensibility, first in the supra- and infra- spinal fossa. In this form of the disease certain brain-nerves are often decidedly affected in the early stages, particularly the n. trigeminus and the n. recurrens (the latter four times in eight cases). Very often there was increased frequency of the pulse and sometimes hypertrophy of the upper arm.

As in the first case of Hatschek, Bregman, of Warsaw, ⁷⁵_{Sept. 16, '96} was able to observe in a man the symptoms of syringomyelia limited to the left side of the body (with the exception of the lower extremity) and only presenting themselves in the form of disturbances of sensibility; so that the diagnosis was for a long time rendered doubtful. A man, 48 years old, whom Preobrajensky, of Moscow, ²¹¹⁹_{Nov. 13, '94} had occasion to observe, was suddenly affected, while in perfect health, with paralysis of the four extremities and unconsciousness, general anæsthesia up to the neck, retention of the urine and alvine incontinence. Death occurred in three weeks from pyelonephritis and cystitis. A bulbar apoplexy had been suspected, but, on the contrary, there was found below the pyramids a crossing through two and one-half segments of the spinal cord and, behind the central canal, a central cavity, with gliomatous walls, and sclerosis of the vessels.

The case of a woman, 45 years old, presented by Raymond, of Paris, ⁷³_{Sept. 14, '96} is atypical, although the diagnosis was not positively established. The symptoms of Brown-Séquard's semilateral paralysis (spinal hemiplegia on the left with augmentation of the patellar reflexes, hemianæsthesia with syringomyelitic dissociation on the right).

Lorrain ⁷³_{Nov. 17, '96} found in one case the symptoms of acromegaly (enlargement of the hands, kyphosis) together with those of syringomyelia. An attempt has also been made to establish a family type of syringomyelia (see Ferranini, last year's ANNUAL). Verhoogen and Vandervelde, of Brussels, ⁸⁶⁸_{Sept., '96} observed three cases of supposed syringomyelia in one family, and conclude that in the family type a cavity myelitis is the basis of the affection, and not gliomatosis or primary hydromyelia. This form is not supposed to have anything in common with leprosy, but is in intimate relation with sclerosis.

[Although several of the histories of cases allow of a certain doubt concerning the correctness of the diagnosis, the illustrations are fully convincing of the fact that the cavity in the spinal cord, observed in one case, is by no means syringomyelitic in nature, but is only the widened lymph-space, which is often similarly enlarged

and in which the vessels alongside of the central canal, the well-known anastomotic arteries and veins, follow their course.—H. O.]

The case of Straub, of Munich, ³²⁶_{N. 14, '94} must be considered as one of true hydromyelia. There was pronounced scoliosis on the right, atrophy of the upper extremities, and contracture of the flexors of the hand. Sensibility remained unaffected, as did the joints. The central canal was found excessively enlarged throughout the entire length of the spinal cord, and particularly in the upper thoracic and lower cervical portions. In a spinal cord examined by him Luxenburg ⁵²⁰_{N. 14, '94} found, together with the hydromyelia, several purely gliomatous spots, as well as genuine syringomyelitic cavities.

[As a matter of fact, all transition forms, from true hydromyelia to syringomyelia, may be found without the participation of the central canal, as has been emphatically asserted by Schlesinger.—H. O.]

Besides a rather typical case of syringomyelia, H. Simon, of Metten, ²¹⁵⁰_{N. 12, '94} also describes one of true hydromyelia in a girl subject to chorea.

We have previously mentioned the difficulty presented by the differential diagnosis between syringomyelia and hysteria. It should also be remembered that the two affections may be combined in the same individual, in exceptional instances, as appears to have been the case in the patient observed by Agostino. ⁵⁹¹_{N. 12, '94} This writer proposes resorting to hypnotism as an aid in making the diagnosis. A working-woman, examined by Wichmann, of Brandenburg, ⁴_{N. 12, '94} presented the type of syringomyelia in general, although muscular atrophy, pupillary differences, and affections of the joints were absent. He likewise resorted to hypnotism, and, as in this condition the paresis and the hemianæsthesia disappeared, he is probably justified in making a diagnosis of hysteria.

Eulenburg, of Berlin, ⁶⁹_{N. 27, '96} saw the symptoms of syringomyelia present themselves in a man, 30 years of age, after a fracture of the left radius,—i.e., atrophy of the smaller muscles of the left hand with fibrillary twitchings; disturbances of sensibility in the left hand and forearm (particularly the muscular sense and that of temperature); small, painless ulcerations in this region; contraction of the left palpebral fissure and of the left pupil. He is of opinion that there was, in the first place, a traumatic neuritis, consequent upon the injury, merely simulating syringomyelia.

As contributing to the solution of the constantly-disputed question as to the relation between syringomyelia, Morvan's disease, and leprosy, Prus, of Lemberg, ³⁶⁸_{N. 27, '96} presents an important article. In a typical case of Morvan's disease which he observed

in Lemberg (province of Galicia) the bacilli of leprosy could be seen, although leprosy had until then been unknown in that country. He therefore considers that Morvan's disease represents a form of leprosy,—*lepra anæsthetica mutilans*,—and that the cases of syringomyelia, as well, which run their course under the type of Morvan's disease, also come under this category.

Marinesco, of Paris, ¹⁴_{Aug. 21, '96} on the other hand, adheres to the opinion that the prime factor is not the *lepra bacillus*, since in his experiments the results coincide with those of others (Pitres and Sabrazès), none of these bacilli being found in the endymal gliomata.

With regard to possible therapeutic results, we may mention the fact that, according to Sängér, of Hamburg, ²¹²¹_{July 10, '96} the severe pains which were present in two cases totally disappeared during a course of treatment at the baths of Oeynhausen.

Tabes Dorsalis.

Etiology and Pathogenesis.—A complete presentation of the relation between tabes and syphilis in general and the tabetic arthropathies in particular has been given by J. Mickle, of London. ⁴⁷_{Summer and Autumn, '96}

A full solution of the question of the etiological importance of syphilis in tabes has not yet been reached. Many do not even recognize such a relation, while by some too great an importance is attached to it, since they consider that, in every case of tabes, a previous syphilitic infection must have been present. Möbius, of Leipzig, ²¹²²_{No. 1, '96} belongs to the latter class, and this time again takes an extreme stand. He is of opinion that tabes and progressive paralysis are merely metasyphilis or a metasyphilitic nerve-disappearance,—that is to say, a primary atrophy of nerve-ports of which the main factor is syphilis. On the other hand, Pitres, of Bordeaux, ⁶_{Apr. 12, '96} asserts, through the thesis of his pupil, Berens, basing himself upon 225 cases, that, although syphilis could be proven in about 55 per cent. of the cases, in many of them it was associated with other causes of tabes dorsalis,—as hereditary joint affections, alcoholism, sexual excess, etc.; so that the exact percentage which could safely be attributed to syphilis was reduced to 22.33 per cent.

Storbeck, of Salzwedel, ²¹¹⁰_{'96} found, under the guidance of Leyden, who still denies the etiological significance of syphilis for tabes, among 108 cases, only 20.4 per cent. which were undoubtedly syphilitic and 58.3 per cent. non-syphilitic. Cardarelli ⁵⁰⁵_{May 11, '96} is also of the opinion that the etiological importance of syphilis is in general overestimated.

Darkschewitsch, of Kazan, ⁸¹_{Dec. 1, '94} believes that the undeniable importance of syphilis in tabes is to be found in a toxic affection of the peripheral nervous system, and that, therefore, the toxic polyneuritis is the principal affection and the disease of the spinal cord only secondary.

The not infrequent insufficiency of the aortic valves in tabetic subjects is considered by Blathner, of Berlin, ²¹¹⁰_{'94} principally with regard to the question of an eventual crossed action of the two affections. He is, however, unable to come to any fixed conclusion.

[The most noteworthy point in this dissertation, which was completed under the supervision of Leyden, is that, in the faction which has, up to the present, absolutely denied the significance of syphilis, there is a tendency to at least admit the possibility that, in a certain number of cases, a syphilitic basis is present. In the majority of text-books on nervous diseases it is stated that trauma may also give rise to tabes dorsalis. Last year, however, Hitzig considered such a traumatic tabes as most improbable (see ANNUAL, 1895).—H. O.]

Morton Prince, of Boston, ²⁴²_{Feb. 1, '96} expresses the same opinion. He has collected the cases reported in the literature and comes to the conclusion that, all the facts being considered, the current view that locomotor ataxia may be caused by traumatism *per se*, irrespective of a direct lesion of the cord, is not sustained by the published evidence thus far adduced. If such a relation exist, further proof is required before it can be accepted. It would seem to be more probable, aside from mere coincidence, that, when a sclerosis of the posterior columns develops after a traumatism, the subject was already doomed to this condition, the process having already begun, and that the traumatism at most only accelerated the development of the symptoms and possibly of the anatomical process.

Craig, of Dublin, ¹⁶_{June, '96} however, presented to the Royal Academy of Medicine in Ireland a patient in whom ataxia of all four extremities occurred after a fall upon the back, together with anæsthesia, loss of the patellar reflexes, and gastric and rectal crises. The author considered the case one of locomotor ataxia from injury. The correctness of his diagnosis was questioned by several of the physicians present.

Bernhardt, of Berlin, ¹²⁰⁴_{No. 7, '96} in an account of a case of tabes developing very shortly after an injury to the foot, calls attention to the fact that one can scarcely be careful enough, in such cases, before deciding upon a diagnosis of traumatic tabes.

[An instructive proof of this is furnished by the patient of

Pineles, of Vienna, that of a coachman in whom, after a fracture of the arm, the primary symptoms of tabes were noticeable; although the man denied syphilis, a careful investigation elicited the fact that he had formerly been infected. The trauma in this case, therefore, could, at most, only have hastened the appearance of the tabetic symptoms.—H. O.]

Mœbius, of Leipzig, has frequently reported the occurrence of tabes in women; he briefly describes ²¹²²_{Nov. 3, '96} six new cases without advancing any further conclusions.

L. Pierce Clark, of Middletown, ⁵⁹_{Sept. 22, '94} had under observation a young woman, only 23 years old, who presented pronounced symptoms of tabes after a severe syphilitic infection.

Concerning the pathogeny of tabetic disease of the spinal cord, Obersteiner and Redlich, of Vienna, last year expressed the opinion that they were principally caused by a tightening or snaring of the posterior roots at the point of their entrance into the spinal cord, this tightening being occasioned by a retraction of the pia mater due (at least, in quite a number of cases) to syphilis. Various opinions have been expressed against this new view of the subject.

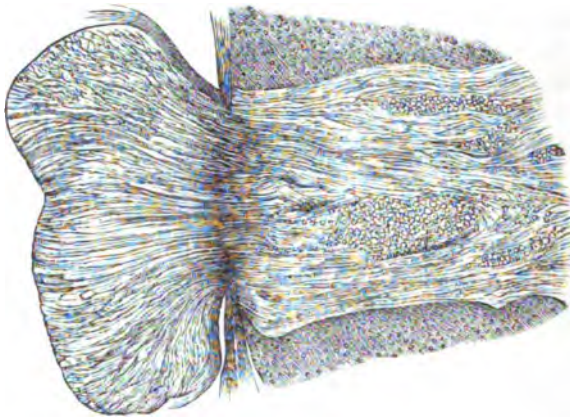
Borgherini, of Padua, ³⁹⁷_{V. 2, '96} does not attribute too great an influence to syphilis as a cause of tabes, and makes a distinction between the cases in which meningeal changes are shown and those of true tabes.

Nageotte, of Paris, ⁷_{Nov. 14, '94} expresses about the same opinion as Obersteiner and Redlich; he also holds that there is a ligation or snaring of the posterior roots by a process which may be termed inflammatory, causing degeneration of the posterior columns; but he does not establish the point of the tightening pressure at the spot where the root extends through the pia mater, but rather at the passage of the outer spinal meninges, where the dura mater and arachnoids lie closely against the pair of roots, in funnel shape, inclosing the same as far as the spinal ganglion. At this point he finds in tabes a perineuritis with nuclear proliferation and consecutive sclerosis. This occasions a circular tightening of the roots by which these, and particularly the posterior roots, are very much injured.

Obersteiner, of Vienna, ²¹¹¹_{Nov. 3} has investigated the statements of Nageotte, and found that in reality such changes frequently occur in tabes at the point indicated, but that they are of no importance as far as the degeneration of the posterior roots is concerned, since the latter show the same degree of degeneration, both in front of and behind this point, in a longitudinal section. Obersteiner, therefore, holds to the opinion that the point of entrance of the

posterior roots into the spinal cord, with its more or less distinctly visible and normal contraction (see cut), is the actual seat of the lesion; and he calls attention to the fact that one must by no means expect always to meet with distinctly visible changes in the pia mater; typical meningitis need not necessarily be present, but perhaps only a cicatricial contraction, such as is seen as a result of syphilis in other organs (the liver, for instance).

In a later work Nageotte, of Paris, ¹⁰⁹⁰_{nos. 12, 13, 14} attempts to prove, probably not with justice, that longitudinal sections through the nerve-roots do not furnish any evidence, but that an uninterrupted series of cross-sections are required. Nageotte was even able ⁹⁴_{on. 78} to see the diffuse inflammatory processes in the inner meninges of the



A NORMAL POSTERIOR LUMBAR ROOT AT ITS POINT OF ENTRANCE INTO THE SPINAL CORD. (OBERSTEINER.)

At the spot where the root is tightly compressed by the pia mater it appears darker, while the medullary sheaths are much thinner or are totally absent.

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spinal cord in tabes, and has described them. Nevertheless, he does not admit their significance in disease of the posterior roots, and most unjustly goes so far as to assert that the above-mentioned compression of the normal posterior roots (see Obersteiner's cut) is merely a post-mortem phenomenon.

[It should be stated that this compression is present in every case, but that it is subject to great individual variations, thus perhaps giving rise to a more or less pronounced tendency to tabetic disease.—H. O.]

Weil ³⁶⁸_{2.26} is of opinion that the theory that tabetic sclerosis of the posterior columns is a disease of the posterior roots during their intra-medullary course does not completely explain the anatomical condition in recent cases.

For some time past the relation between tabes and progressive paralysis has frequently been a subject of extensive discussion among French neurologists. Raymond, in particular, has emphatically expressed the opinion that these two affections are not only frequently associated, but that they are in reality only two forms of one and the same disease. On the other hand, Ballet and Joffroy advocate the view that, when in rare instances tabes and progressive paralysis occur in the same individual, it is merely a question of a casual occurrence of two nervous diseases which do not stand in any intimate relation one to the other. Joffroy and his pupil, Hojanovitsch, do not even admit syphilis as a common cause of these conditions. Renaud also believes in a nosological duality; according to him, tabes is present in 3 per cent. of paralytic subjects.

Quite recently Joffroy, of Paris, ⁴⁵²_{N.S., 76} has slightly modified his opinion. He saw a patient who at first presented the symptoms of classical tabes without any cerebral manifestations. Only after several years were symptoms of dementia paralytica added to the previous ones. At the autopsy the well-known changes of progressive paralysis were found in the brain. The spinal cord, however, presented a condition differing from that of tabes. Even the posterior columns did not show the regular systematic degeneration peculiar to that disease; the anterior-horn cells in the dorso-lumbar region were atrophied and Clarke's columns partially so; there were also diffuse sclerosis of the lateral columns, while the posterior roots were but slightly affected. Joffroy therefore considers that dementia paralytica and true tabes are only rarely combined, but that the former affection may begin with spinal symptoms which simulate tabes; it is then merely a pseudotabetic process with a different condition in the spinal cord.

Symptoms.—(a) *Spinal symptoms (including the spinal nerves).* Leimbach, of Heidelberg, ¹⁰⁰⁵_{B.T., N.S., 76} has collected 400 cases of tabes from the private practice of Erb, and considers them with reference to the frequency of the single symptoms. One hundred of these cases were still in the initial stages. As a primary symptom lancinating pains are most frequently mentioned,—200 times in the legs, 5 times in the back, and once in the arms. Tabes begins, in the majority of instances (67 per cent.), with lancinating pains; nevertheless, these are often not present alone as a first symptom, but are accompanied by one or several others. On the other hand, these lancinating pains may exist for a number of years without the disease manifesting itself in any other way. With regard to the frequency of the single symptoms of tabes, we quote from the author's table as follows:—

	Per Cent.
Failure of patellar reflexes,	92.00
Romberg's symptom,	88.75
Lancinating pains,	88.25
Vesical disturbances,	80.50
Ataxia of the legs,	74.75
Changes in pupillary reaction,	70.25
Paræsthesia of the legs,	64.50
Weakness of the legs and quick fatigue,	62.25
Absence of sexual desire,	58.25
Changes in size of pupils,	48.25
Retarded transmission of pain,	36.50
Hyperalgesia of the legs,	33.75
Girdle sensation,	31.00
Transitory diplopia,	26.50
Hyperæsthesia of the legs,	23.25
Ulnar paræsthesia,	16.50
Paralysis of ocular muscles,	16.00
Atrophy of optic nerve,	6.75
Persistence of pains in the legs,	6.00
Crises,	5.25
Arthropathies,	1.75

Putnam ⁹⁹_{Aug., '96} observed that marked hyperflexion of the leg at the hip-joint, without bending it at the knee, is painful in healthy subjects, while in tabetics, even during the first stages of the disease, it occasions no pain. He therefore finds in this procedure an aid in establishing the diagnosis of tabes, even in the primary stages.

Mœbius, of Leipzig, ²¹²²_{Nov. 4, '96} has often observed a transitory paralysis of the radial nerve during the course of tabes; he is, however, of opinion that it is merely due to a traumatic compression paralysis, which is merely facilitated by the tabetic changes in the nerves already present. Tabes thus gives rise to a predisposition to the paralysis of the radial. Mœbius has likewise seen atrophy of the right thenar and musc. interosseus primus; later on there was also atrophy of the right cucullaris muscle.

Fahmüller ²⁰³⁸_{'94} describes a case in which very soon after the onset there was bilateral atrophy of the thenar upon a neuritic basis. Follen Cabot, of New York, ⁸¹⁴_{Apr. 1, '96} reports a case of tabes with retention of the patellar reflexes.

A short review of the significance of the patellar reflexes in the diagnosis of tabes is given by J. B. Charcot, of Paris. ⁸¹_{Apr. 4, '96}

Raichline, of Paris, ⁹²⁷_{June 29, '96} observed in an old case of tabes, after hemiplegia, not only secondary contractures, but also the re-appearance of the tendon reflexes.

Several articles may be here mentioned which, without any special reference to tabes, are devoted to the study of the tendon reflexes. Guy Hinsdale and John Madison Taylor, of Philadelphia, ⁴⁵¹_{June, '96} again refer to the crossed knee-jerk, or contralateral adductor reflex. (See ANNUAL for 1895, vol. ii, B-39.)

Gerhardt, of Strassburg, ¹⁰⁰⁵_{Nov. 12, '96} saw a case of compression

myelitis in which the spinal cord in the middle thoracic portion had been compressed by an angioma extending from the vertebræ, and had contracted in a cicatrix in which not a single nerve-fibre was visible. In this patient the tendon- and skin- reflexes in the lower extremities had been exaggerated in the beginning, but later on the tendon-reflexes were again diminished and disappeared six months before death.

Bastian and Bruns have laid special stress upon the symptom of retention of the tendon reflexes in total transversal lesion of the spinal cord. The latter ⁷⁵_{Jan. 16, '96} contradicts the theoretical explanations given by Gerhardt.

The disturbances of sensibility met with during the progress of tabes are often much less considered than they should be. For this reason Max Laehr, of Berlin, ⁸⁶⁸_{2, 27} has undertaken a careful examination of sixty tabetic patients, with special regard to this point. In all of the cases except five, which were tabo-paralytic throughout, hyperæsthesia of the trunk was a constant and early condition. The beginning upon the body (sometimes only unilateral) usually corresponds with the region of the central dorsal nerves; the further development then generally follows a fairly symmetrical zone, circumscribing the trunk, and then spreads over the arms. The same course is followed in the lumbar and sacral regions. The development of this tactile anæsthesia does not correspond with the region supplied by the peripheral nerves, but rather with that of the spinal roots. This clinical picture furnishes a further proof of the theory which refers tabetic disease of the spinal cord in general to a degeneration of the posterior intramedullary root-fibres. At the boundaries of the hyperæsthesia and between the lymphatic zones there is generally a pronounced hyperalgesia, particularly as regards cold. Sensory-irritation phenomena are frequent, but not constant. Marked analgesia of the ulnar nerve appears, as a rule, to accompany other disturbances in the ulnar region.

[It should be here mentioned that the ulnar symptom is also frequently met with in dementia paralytica, and is therefore not characteristic of tabes.—H. O.]

Gœbel, of Grafenberg, ⁷⁵_{Aug. 16, '96} has made a study of this question and has found analgesia of the ulnar nerve in other mental diseases, though seldom (most often in epilepsy).

Collins, of New York, ²⁴²_{May 8, '96} demonstrated a case which he considers as one of beginning tabes and in which athetosis of the right arm was a pronounced primary symptom.

Ormerod, of London, ²_{Dec. 2, '94} and McCartie, of Newark, ¹_{Mar. 9, '94} refer to the symptom of ataxia in general.

(b) *Cerebral-nerve symptoms.* A short account of the eye disturbances occurring in tabes has been given by Kräntle, of Stuttgart. ²¹²³₇₄ Wendell Reber, of Pottsville, ⁷⁸⁷_{June, 76} calls attention to the fact, already known, that, among the cerebral nerves, those in relation with the eye—that is to say, to its muscles—are most frequently affected. Panas, of Paris, ¹¹⁵³_{May 4, 74} also gives an account of the diseases affecting the muscles of the eye in tabes. He states that a constant secretion of tears is sometimes met with, while in other cases there are actual tear-crises, similar to gastric crises. In the case of Chubb, of Palenville, ¹_{June 14, 76} a central scotoma of the left eye preceded the beginning of tabes, disappearing after two months without any special treatment, never to re-appear.

Dejerine, of Paris, ⁸¹_{Mar. 20, 76} makes the symptoms of amaurosis in tabes the subject of a careful study. It is an undeniable fact that tabetic symptoms usually remain stationary, and sometimes even disappear, when blindness occurs in the early stages of the disease. The author presented two women who had had syphilis and in whom the first signs of tabes were plainly recognizable in the form of lancinating pains. In proportion as the sight became affected the pains diminished. In one woman, however, gastric and clitoric crises remained undiminished. A large proportion of blind tabetic patients always remain in the preataxic period, while in patients retaining their sight this period rarely lasts a very long time.

Benedikt also states that the specific motor symptoms in tabes begin to disappear as soon as atrophy of the optic nerve sets in. Dejerine does not concur in this opinion, for in the majority of instances atrophy of the pupils is one of the earliest symptoms of tabes and rarely appears again at that stage in which the motor inco-ordination is already developed. In the very few cases of this kind observed an improvement is noticed in the pains, but none in the motor symptoms upon the beginning of blindness. Atrophy of the optic nerve in the early stages of tabes is almost always unilateral at first. It progresses rapidly; so that usually after six or eighteen months, and at most after two years, complete blindness results. The pupils are not sensitive to light or pain, but react upon convergence. It is also noteworthy that blind tabetic patients do not present Romberg's symptom. In some few cases the atrophy of the optic nerves is for a long time the only symptom of tabes. The Argyll-Robertson symptom is present, and from it the diagnosis may be made. The pathogenic relation between atrophy of the nerves of sight and alterations in the spinal cord is by no means clear. Moxter, of Berlin, ⁶⁹_{Sept. 1, 76} and Bruner ⁹_{Feb. 1, 76} have also studied tabetic atrophy of the optic nerve. Bernhardt, of Berlin, ⁴_{July 12, 76} saw the rare condition of optic neuritis (bilateral) as an initial symptom in tabes.

The disturbances of hearing during tabes, so frequently overlooked, have been subjected to careful study by Collet, of Lyons. ¹¹⁵⁸_{Jan. 12, '96} They are by no means so rare as has been supposed; when a careful examination is made, some such disturbance will be found present in nearly every case. These conditions are, however, only in a few instances referable to an affection of the acoustic nerve or of its nuclei. Only four cases have been met with up to the present in which atrophy of the acoustic nerve was discovered at autopsy. In the great majority of cases there is a sclerotic affection of the middle ear, which may be considered as a trophic disturbance following a diseased condition of the trigeminus nerve. Usually there is a more or less pronounced deafness, which is generally very quickly developed, often in a few months. In more than half of the cases a subjective noise precedes the deafness, the sound being of various natures (musical, whistling, buzzing, etc.) and also of varying intensity, sometimes excessively loud. A noteworthy case with pharyngeal crises is described by Courmont, of Lyon. ⁹²_{Sept., '94} The patient was a man, 62 years old, who had become exceedingly emaciated, the slightest attempt at taking nourishment causing severe contractions of the pharynx. After a single treatment by suspension this condition entirely disappeared.

Moreira ²¹²⁴_{Nov. 1, '96} also reports two cases of severe pharyngeal crises, one of the patients dying during such an attack. Herms aus Böhne ²¹¹⁰_{Nov. 1, '96} used 122 cases of tabes from the clinic of Gerhard, of Berlin, as material for study and found laryngeal disturbances referable to tabes in 17 cases; among these the abductors of the vocal cords were affected 11 times,—5 times on both sides, 4 times on the right side, and twice on the left,—with paralysis of the posticus nerve; once, paralysis of the other n. recurrens with unilateral posticus paralysis. Simple paralyzes of the recurrens are more rare (once unilateral, once bilateral). In general, paralysis of the posticus in tabes is very seldom accompanied with subjective troubles. In 4 cases laryngeal crises were observed.

Fr. Hawkins ⁶_{Jan. 1, '96} reports a case of tabes with bilateral paralysis of the abductors in the larynx. The paræsthesia in the region of the trigeminus designated as "Hutchinson's mask," with a feeling as of a spider-web over the skin of the face, may, according to Möbius ²¹²²_{Nov. 1, '96} be met with in the early stages of tabes, and is of diagnostic value, as the author demonstrates by an illustrative case. Berger ³¹_{Nov. 1, '96} calls attention to anæsthesia of the cornea and of the conjunctiva in tabes.

Obersteiner, of Vienna, ²¹¹¹_{Nov. 1, '96} examined a case of lingual hemiatrophy in a tabetic woman 44 years old. In the diseased portions

long rows of tiny fat-nuclei were visible in the muscular fibres, and the nerve-fibres in the lingual net-work also showed a perceptible degeneration. The nucleus of the hypoglossal nerve, on the contrary, appeared entirely healthy, although a number of other nerve-nuclei were found to be diseased. The case in question was thus one of neuritic atrophy of the tongue.

(c) *Visceral symptoms.* L. Wolff⁸⁷² describes three cases of tabes in which gastric crises were the first symptom, and, later on, remained the dominant one. There was a constant lack of hydrochloric acid both during the crises and in the intervals. The author advises, in treatment, 0.01 gramme ($\frac{1}{8}$ grain) of nitrate of silver and 0.03 cubic centimetre ($\frac{1}{2}$ minim) of extract of belladonna in the free intervals, an hour before meals.

Bourguignon²⁰⁰⁰ found, in tabetic patients suffering from gastric crises, an hyperacidity of the stomach, which did not, however, increase during the attacks, thus showing merely a predisposition to this condition.

[It is striking that gastric crises are very frequently combined with laryngeal symptoms and are seldom absent when arthropathies are present.—H. O.]

(d) *Trophic symptoms.* The muscular atrophies have already been discussed in another section of this department. Among other trophic disturbances to be met with during the course of tabes dorsalis the arthropathies are of the greatest interest. Klemm, of Riga,⁸⁰¹ treats comprehensively of this subject. Of personal material he had seven cases of nervous arthropathies at his disposal (five times in tabes, twice in syringomyelia). He finds that the condition in the body of the joints, as well as in the soft portions, does not differ greatly in neuropathic arthropathies from that existing in ordinary arthritis deformans. The periarticular changes occurring in the form of ossifications of the soft portions surrounding the joints are characteristic of neurotic arthropathies as well as the formation of exostoses, which are often located at a considerable distance from the affected joint. The pronounced pathological changes are also indicative of this class of arthropathies, since in arthritis deformans they very rarely attain a similar extent or degree of intensity. Neurotic arthropathies also announce themselves by intra- and peri-articular exudations, which play an important part therein, while arthritis deformans usually progresses in a dry form. No anatomical differences have as yet been established between arthropathies in tabes and in syringomyelia.

[The pathogeny of tabetic arthropathy is still shrouded in mystery. Doubtless the interchange of action between the sensory and vasomotor nerve-functions is disturbed by the pathological

conditions in the nervous apparatus, but it is still a question whether the neurotic arthropathies are referable to such a disturbance; perhaps there is merely a condition of ordinary arthritis deformans which has undergone a decided modification owing to the lesion of the nervous system.—H. O.]

With the help of several interesting cases of tabetic arthropathy and the use of material from the Anatomico-Pathological Institute in Vienna, Budinger⁷⁶¹ attempts to demonstrate that neuropathic joint affections are referable to arthritis deformans, but that the latter is to be considered as a result of the disease of the central nervous system. Purely traumatic forms may also occur. Outside injuries and also the further progress of the central disease exert an influence upon the further development of the process. Tabetic fractures occur in hypertrophic as well as in atrophic bones. The development of the "tabetic foot" is also discussed.

Further cases of tabes with arthropathies are cited by Nugent, of Dublin,¹⁶ and Lépine, of Lyons.²¹¹ The latter's cases are interesting from the occurrence of a swelling at some distance from an articulation, at first sight making one think of a cold abscess, but later on recognized as a collection of synovial fluid. As to the origin of these collections, Lépine expressed the opinion that there had been an exaggerated production of synovial fluid causing rupture of the sac and effusion into the other parts. What is surprising in these two cases is that the fluid was not absorbed.

Parker Syms, of New York,¹ also considers the question of tabetic arthropathies, and particularly emphasizes the fact that the condition is one of trophic degeneration without inflammation. In certain cases he advises excision of the diseased joint.

Newmark, of San Francisco,⁹ and Schoene, of Düben,²¹¹⁰ also wrote concerning arthropathies in tabes. Glorieux and Van Gehuchten¹⁰⁶⁰ agree with Brissaudin that trophic disturbances are principally met with in tabetic patients in whom the sensory symptoms predominate (sensitive type). It should be noted that Westphal, of Berlin,⁴ found trophic disturbances characteristic of tabes in a woman, 38 years old, suffering from dementia paralytica. There was atrophy of the jaw, with a rapid falling out of the teeth, tabetic foot on the right, perforating ulcer on the left foot.

Kalischer⁶⁹ describes a tabetic patient with necrosis of the jaw,—a symptom which is, moreover, not very rare in tabes and which is generally combined with other trophic disturbances. Du Castel saw¹⁴ necrosis of the jaw with loss of the teeth in the

early stages of the disease. Mœbius also reports a similar case in which fifteen teeth fell out during one spring without any pain; the teeth of the upper and lower jaw on the right side, as well as the alveolar processes, were missing and the jaws themselves atrophied in the highest degree.

Waldo, of Bristol, ²_{Dec. 1, '94} had under treatment a man with an arthritic swelling of the knee and an ulcer upon the sole of the foot which showed no tendency to heal. The simultaneous defective reaction of the pupils to light and pain and lancinating pains in the knee, which were present, left little doubt as to the correctness of a diagnosis of beginning tabes.

The case of E. Fournier, of Paris, ¹¹⁵³_{May 25, '96} one of the early stage of tabes, was noteworthy from the fact that the ulcers on both sides were not, as is usually the case, on the under side of the foot, but on the dorsum, at a point about corresponding with the first metatarsal bone.

In a man, 38 years old, suffering for six years from tabes, Girandeau, ¹¹⁵³_{Oct. 7, '94} observed peculiar trophic disturbances appearing spontaneously without pain. The ulcerations were situated on the nose and both ears, a large one (one centimetre) over the nasolabial ridge, another on the lobe of the nose and on the margin of both nostrils; superficial erosion on both ears, and symmetrically superficial cutaneous ulceration of the superior part of the concha.

Gouley ¹_{Jan. 1, '96} described a spontaneous fracture of the tibia, with a demonstration of the preparation in a case of tabes.

The multiple lipomata described by Tscherkassoff ³¹_{Mar. 28, '96} may also be regarded as a peculiar trophic manifestation in tabes. The patient suffered from lancinating pains and paræsthesia in the lower extremities. After two years these symptoms disappeared and instead small lipomata appeared simultaneously on both forearms, at first growing larger and then remaining stationary. Similar lipomata then appeared on the hips and thighs. The unmistakable symptoms of tabes only presented themselves later on. At the time of report, six years after the onset, there were a number of lipomata on the flexor side of the forearm, principally corresponding to the course of the ulnar nerve, and a few over the radial nerve; twelve lipomata could be counted on the right and ten on the left forearm, their size varying from that of a hazel-nut to a pigeon's egg. Possibly the condition is only one of pseudo-lipoma, as in the case reported by Mathieu, ¹⁴_{Mar. 24, '94} that of a tabetic patient with arthropathy of the right knee and several tumors upon the right thigh which the author designated as pseudo-lipomata. There was also an elephantiasis-like thickening of the skin over the hip and leg. Mathieu therefore considers that such

pseudolipomata, such a form of elephantiasis, and neuropathic œdema form a series of trophic disturbances of a similar nature.

(e) *Psychical symptoms.* [Psychical disturbances during the course of tabes are rather rare, but not quite so rare as is usually believed. It is necessary, in such cases, to carefully guard against confounding these disturbances with a condition of dementia paralytica combined with ataxic symptoms.—H. O.]

The psychical symptoms of tabes are considered ¹⁰¹⁵ by Gruet and by J. V. Blachford, of Bristol, ¹⁸⁶ who mentions two cases of melancholia in combination with tabes.

Treatment.—[In the therapeutic field, but little that is new has, unfortunately, been of late reported; so that no particular progress can be recorded. Single cases in which a considerable improvement has resulted from suspension are reported from time to time, but they are not numerous.—H. O.]

The case of Courmont (see page B-41) is first to be cited, severe and dangerous pharyngeal crises disappearing after a single suspension. De Forest Willard and Guy Hinsdale, of Philadelphia, ⁹ also consider this measure as a useful one; in a number of cases certain symptoms are improved, as, for instance, pains, sexual weakness, and incontinence. Hugh Cuthbertson, of Chicago, ³⁰ cites the case of a tabetic patient who was obliged to use a wheel-chair; suspension was resorted to every other day during a long period (several years). After from fifteen to eighteen months he was able to walk with two canes, and after three years he could walk alone, play croquet, etc. The bladder and rectal symptoms also disappeared under this treatment. Blondel, ¹⁰⁹⁰ of Paris, found a substitute in one case for suspension in the following treatment: The patient lay upon his back and bent the legs and hips in such a way as to have the knees come as near as possible to the chin; with the aid of a hoop this position was more easily supported. This was practiced every evening, and after eight days the lancinating pains had disappeared. The treatment being continued, the paralysis of the bladder also disappeared and the gait was much improved.

Joachimsthal ²²⁶ has devoted himself to studying the question as to whether suspension is in any way dangerous to the organs of circulation. He concludes that this is not the case when the necessary precautions have been observed, and that then the treatment can even be resorted to when the patients have heart affections. Experiments, made at the medical clinic of Jena upon a number of patients suffering from tabes and other nervous affections, with the suspension method, have, according to Schlick, ²¹⁰⁹ given very unsatisfactory results.

The surgical treatment of neuropathic arthropathies is considered in detail by Chipault, of Paris.⁴⁵²_{Mar., Apr., '96} Frenkel's method of treatment appeared to give good results in a number of cases. Frenkel, of Heiden,¹¹⁴_{Nov. 20, '96} himself recommends his method for ataxia of the upper extremities. It is first necessary to determine which muscular groups are affected, and it is particularly important to know whether the shoulder-muscles are involved.

Ataxia in the last-named region usually disappears readily and quickly under treatment, while that of the forearm and hand is corrected with more difficulty. A series of different apparatuses were constructed for this purpose; the patient must, for instance, insert a number of pegs in a plate provided with holes, catch swinging leaden balls, etc. The practice should be varied so that the patient may not grow fatigued and lose interest. They must also resume certain occupations (the fastening of their clothes, writing with pen and ink, piano-playing, etc.) in case they have, for greater ease, given these up. Even in pronounced cases of ataxia very good results may be expected; the moral effect of the treatment is also quite considerable. The improvement noticed by the patient and the physician exerts a powerful influence upon the disposition, sleep, and general condition. The sensibility of the skin and muscles also improves under this treatment.

Verrier⁷⁸_{Sept. 14, '96} has also used Frenkel's method, with good results, for symptoms of inco-ordination, even in the upper extremities; as a substitute for Frenkel's apparatuses, which are rather difficult to construct, he recommends certain articles in general use and well-known games. In another article⁶⁴⁸_{Nov. 7, '96} Verrier calls attention to a peculiar mode of treatment for tabes and other nervous diseases, to which he gives the name of aquapuncture, or filiform douche.

[While we admit that, in reality, but little can be done for the benefit of patients having tabes, we must, nevertheless, hail with pleasure any mode of treatment calculated to alleviate the unfortunate condition of the sufferers.—H. O.]

Obersteiner, of Vienna,⁸_{Nov. 17, '96} directs attention to the fact that, in the majority of apparently-organic nervous affections, there is also a functional psychical factor; this explains the wonderful improvement in organic cerebral lesions under hypnotic influence,—i.e., suggestion.

Bérillon, of Paris,²¹²⁷_{'96} therefore proposes the use of this method for tabes. Without its being in any way possible to influence the organic changes in the nervous system, one may yet be able to remove a number of functional disturbances and to materially help the patient.

Atypical Cases of Tabes.—Raichline, of Paris, ²⁴_{July 28, '96} describes an atypical case of tabes, interesting from the fact that, besides the sudden appearance of hemiplegia on the left side, there were also pronounced symptoms of paralysis agitans. The case of Beevor, of London, ¹⁰⁷⁷_{Oct. 24} should also be mentioned here. The patient was a man, 42 years old, in whom the first symptoms of tabes had been noticeable twenty-one years before (atrophy of the optic nerve); notwithstanding the long duration of the disease, only the upper portion of the spinal cord is affected. No tabetic symptoms are present in the lower extremities save the absence of the patellar reflexes, while in the upper extremities they are very pronounced.

Th. Diller, of Pittsburgh, ¹⁶¹_{Jan. '96} gives short histories of five, more or less atypical, cases of tabes. Higier, of Warsaw, ⁸_{Nov. 1-5, '96} refers to a tabetic patient in whom, during treatment by suspension, violent hysterical symptoms set in. He also reports a combination of hysteria and pseudotabes in a young girl of 15 years. The cases of Gilbert ⁶⁹_{No. 44, '94}; Weiss, of Vienna ⁸⁴_{No. 27, 28, '94}; Ruhemann ⁶⁹_{No. 44, '94}; Dejezine, of Paris, ⁹¹_{Apr. '96} and of Petrini ³¹⁹_{Sept. 14, '96} also belong to the class of pseudotabes.

Friedreich's Disease and Combined Cord Diseases of the Columns.

[While the question as to the spinal or cerebral nature of Friedreich's disease formed the subject of numerous controversies and animated discussions during the past year, a considerable amount of clinical material has been published which appears to indicate, at least, as far as concerns the anatomical basis of hereditary ataxia, that there are two varieties,—one spinal and one cerebral.—H. O.]

No doubt, as Londe, of Paris, has shown in his comprehensive work, ²¹²⁶_{'96} both forms will be ascribed to one and the same disease group, of an hereditary nature; in the one case the arrested development is particularly and primarily in the cerebellum, and in the other in the spinal cord. Hereditary cerebellar ataxia may thus be complicated with spinal-cord symptoms, just as in Friedreich's disease cerebellar atrophy may present itself; it is even possible that sometimes the entire cerebellar and spinal-cord systems may be simultaneously affected in one and the same individual,—an opinion, moreover, which has already been advanced by F. Schultze, of Bonn. ⁴_{Aug. 12, '94}

It does not follow, however, that hypoplasia of the cerebellum is always combined with disturbances of co-ordination, for König, of Berlin, ⁴_{Aug. 19, '96} saw a young girl with typical cerebral paraparesis

of congenital origin without the slightest co-ordination symptom. At the autopsy it was found that the cerebellum only weighed 40 grammes ($1\frac{1}{2}$ ounces,—about one-third of the normal weight), but presented an otherwise-normal appearance. He also reports a second case which closely resembled Friedreich's disease and insular sclerosis, but which he relegates to the class of cerebral diplegias, in consideration of the exceedingly difficult and protracted birth.

Verhoogen, of Brussels, ⁸⁶⁸_{Jan. 18, Mar. 2, '96} reports two cases of typical Friedreich's disease. The patients were two sisters who appeared, according to a most careful examination of the entire history, to belong to a very healthy family in which there were no nervous affections. The parents were always healthy, but were closely related (cousins). No syphilis could be proven. These parents had eight children; the first was an anencephalus, the second died young, the third (23 years old) is healthy, the fourth has a *nævus verrucosus* upon the breast, the fifth died very young, the sixth and seventh suffer from Friedreich's disease, and the eighth (4 years old) is, up to the present, healthy. Verhoogen considers himself justified in presuming the well-known alterations in the spinal cord to be present in these two cases.

J. Hofmann, of Heidelberg, ⁸⁴_{Feb. 19, '96} presents two cases,—one a man, 23 years old, in whom the first symptoms of Friedreich's disease manifested themselves between the ages of 14 and 15 years; no other cases can be traced in the family. As in the spinal cord the posterior columns and cerebellar lateral columns were principally found affected, and since, as is well known, these stand in intimate relation with the cerebellum, the type of cerebellar disease may sometimes be present without the cerebellum itself being of necessity affected. The second case presented by Hofmann was that of a boy, 10 years old, likewise without hereditary taint, and with healthy brothers and sisters. Shortly after an attack of pharyngeal diphtheria, with paralysis of the soft palate, the symptoms of Friedreich's disease presented themselves, complicated, however, with epilepsy and slight dementia. The occurrence of intellectual disturbances during the course of Friedreich's disease is rather rare. The three cases of Nolan, of Dublin, ²⁷⁸_{July, '96} are therefore of great interest. The condition was one of hereditary ataxia associated with genêtous idiocy. The patients were two brothers and their sister; the father is an habitual drunkard and the mother "nervous from frights." The patients possess a very low degree of intelligence, but a marked tractability and good humor. In two struma was unmistakably present. The first indications of the trouble were noticeable in all three instances very soon after birth.

In two of the cases the knee-jerk was absent; in one it was present, although in other respects the cases were almost identical. This fact would prove that the presence of this symptom is of no especial importance as far as the diagnosis is concerned. This peculiar combination of congenital sclerosis with a cerebral process, that of idiocy, allows it to be supposed that a similar sclerosis has likewise occurred in the brain.

One of the two patients reported by J. Taylor ¹⁵_{Nov., '94} in whom there was no hereditary tendency, also showed a pronounced degree of feebleness of intellect, with attacks of loss of consciousness, perhaps epileptic in nature (a similar combination as in the above-mentioned cases of Hofmann). In the family of the other patient six cases of a similar disease could be traced.

Sidney Small, of Saginaw, ⁵⁰_{July 20, '95} cites the cases of four sisters suffering from Friedreich's disease, and Fornario ¹⁰³⁹_{V. 12} describes cases in three brothers. Tirasek ⁷⁵⁸_{No. 20, '94} describes a case in whose family a number of marriages had taken place among blood-relations.

The interesting feature in the two sisters whose cases are described by Londe and Lagrange ⁷⁸³_{Mar. 7, '95} is the athetoid attitude which they assume in walking: their heads are often bent forward and there is dorso-lumbar lordosis; their forearms are pronated and their wrists flexed, so that the back of the hand faces the ground. In the case cited by Guthrie ²_{Apr. 15, '95} the diagnosis does not appear to be quite certain.

In the way of post-mortem results, only those observed by J. M. Clarke are reported. ²_{Dec. 2, '94} Two sisters of the patient are suffering from the same disease. There were morbid changes, affecting chiefly the posterior columns, much less the lateral, with involvement, in particular, of the margin of the cord; small size generally of the cord. The feature of greatest interest was a complication of a tumor of the cerebellum, which had almost entirely destroyed the right hemisphere of the latter. The actual symptoms of the existence of this tumor (vomiting, headache, convulsions, optic neuritis, coma) only appeared several months before death.

A peculiar form of hereditary family ataxia was observed by Irwin Neff, of Kalamazoo, ²⁷⁸_{Jan., '95} in 13 members of a family during four generations (8 times in men, 5 in women). The ataxia always manifested itself at an advanced age (from 50 to 72 years), beginning in the lower extremities and with disturbances of speech. In 4 cases there were also psychical changes in the form of a varying degree of dementia.

Rothmann, of Berlin, ¹⁰⁰⁵_{B. 7, B. 4, 4} studied, in a comprehensive manner, the combined diseases of the columns as an independent disease

type clearly distinguishable from other similar pathological processes in the spinal cord,—as, for instance, Friedreich's disease. It is always adults who are affected; the patellar reflexes are at first exaggerated and either persist until death occurs or at least only disappear at the last stages. The process almost always affects the lower extremities first and ascends later on. The disease progresses rather rapidly, never lasting over three years. In the spinal cord a diseased condition of the posterior columns, with an almost entire immunity of the posterior roots, is invariably observed. It appears that the zone of the posterior roots in the posterior columns, pyramidal columns, and the cerebellar tract of the lateral columns are only later on affected. There may, however, be a diffuse slight degeneration of the remaining anterior columns. In a large number of cases the gray substance of the cord is likewise diseased, and Rothmann is therefore of opinion that it would be most correct to consider the disease of the gray substance as the primary process.

[In this he probably goes too far, since, in consequence of a diseased state of the gray substance, and particularly of the cells of the columns in question, we should expect to see, first and most intense, a degeneration of certain well-known short tracts.—H. O.]

Etiologically speaking, concussion of the spinal cord and pernicious anæmia fill the first places, while syphilis does not play an important rôle. Leumalin⁸⁷⁰₃₄ has seen twelve cases (!) of combined disease of the columns, and gives a complete review of the present status of this question.

Jacob, of Erlangen,¹⁰⁰⁵_{24, 21, 1, 2} examined a spinal cord with degeneration of the posterior and lateral column. Nothing could be ascertained of the history of the disease, and the cord itself had been lying in alcohol for a long time, and was therefore of but little value histologically.

Dejerine and Anscher, of Paris,⁹²⁷_{July 7, '94} have been able to make a careful examination of a spinal cord of a tabetic patient (male) who also suffered from paresis of the lower extremities, due, it was supposed, to a diseased condition of the lateral columns. In the posterior columns only a very slightly advanced condition of tabes could be seen; Clarke's columns were markedly degenerated and there was sclerosis of the cerebellar tract of the lateral column. The pyramidal tract of the lateral columns was affected, the disease gradually diminishing toward the upper portion. Since the spinal meninges were normal over the lateral columns, it must be supposed that there was a primary degeneration of the pyramidal tracts.

The case of Olivier and Halipré, of Rouen,¹⁰⁹⁰_{Aug. 20, '96} had followed

a course very nearly similar to that of amyotrophic lateral sclerosis. Upon the examination of the spinal cord only very slight changes were noticeable in the anterior-horn cells, while the pyramidal tracts were degenerated (ascending, to a lesser degree), as well as the cerebellar tract of the lateral columns, Clarke's columns, Lissauer's tract, and the upper portion of Goll's columns. The authors are inclined to refer the changes in the spinal cord to the syphilis previously present.

The simultaneous occurrence of amyotrophic lateral sclerosis and tabes dorsalis may be considered rare. One such case is described by Hektoen, of Chicago, ²⁴²_{Mar., '06} which is referred to in detail under the heading of "Amyotrophic Lateral Sclerosis."

Traumatic Diseases of the Spinal Cord.

Enderlen, of Munich, ⁸⁰¹_{24, '06} has made penetrating wounds of the spinal cord the subject of detailed examination and study. The experimental portion of his work is of especial value. In the clinical portion he presents sixty-seven cases. Basing himself upon his experiments he considers that the functional symptoms of injuries to the spinal cord are more extensive than the anatomical limits of the injury would indicate, as, in consequence of the trauma, swelling and softening occur at a considerable distance. If, later on, some of the symptoms disappear, it is due partially to the diminishing of the swelling and partially to other vicarious conduction-paths. Miners, from the nature of their occupation, are peculiarly liable to injuries of the spine and spinal cord, from the falling of rock or rubbish, causing, in the majority of cases, what the miners describe as a doubling up of the body.

Rhys Griffiths, of Cardiff, ²_{Nov., '06} treats of these injuries and briefly reports a number of cases. He concludes that symptoms of spinal sprain vary in duration mainly according to age. The younger the individual, the more quickly he recovers. He found that bladder disturbances occurred more rarely than paresis and sensory changes.

Ch. H. Schoff ¹¹²_{Oct., '04} cites the case of a young man who, having had a fall, complained of weakness of the arms and legs, which, on the following day, resulted in complete paralysis. The temperature increased and there was slight pain between the shoulder-blades. The possibility of an intra-spinal hæmorrhage was questioned, but it was not deemed advisable to operate, as there was no lesion which could be detected by external examination that would serve as a guide to the exact seat of the trouble. The patient died the next day, when a dislocation of the fifth cervical vertebra was found, with compression of the cord.

Egger, of Basel, ³⁶⁸_{2.27.96} observed a case of total compression of the spinal cord at the level of the first dorsal vertebra (from a fall upon the back) which only ended in death on the eleventh day. It is to be noted that the patellar reflexes were absent and at the end there was aberration of the mind.

Two cases of compression of the spinal cord through fracture of the cervical segment of the vertebral column are reported by Walton, of Suffolk. ⁹⁹_{Apr. 25, 96}

Pearce Bailey, of New York, ¹_{Mar. 9, 96} gives the histories of three cases of Brown-Séquard's paralysis, in two of which there were penetrating wounds of the spine and in the other possibly a glioma.

Herter ¹_{Mar. 9, 96} also gave the history of a similar case. Myosis is always present when the injury has affected the cervical portion of the cord.

Reynés, of Marseilles, ¹⁰⁰_{Mar. 24, 96} also met with the symptoms of Brown-Séquard's paralysis in a case of concussion of the spinal cord (probably hæmatomyelia). There was likewise a dislocation of the iris on the same side. He considers the dorso-lumbar portion of the cord as the seat of the injury.

Dennis ⁹⁶_{Mar. 9, 96} recommends Sayre's plaster-of-Paris jacket in the treatment of traumatic lesions of the spinal cord. Good results may be expected from its use when the seat of the fracture is not above the fourth cervical vertebra. It is advisable at the same time to administer iodide of potassium internally.

[It is well known that the opinions concerning the nature of concussion of the spinal cord, or railway-spine, differ greatly, especially as regards traumatic neuroses. The psychological nature of the symptoms was recognized solely upon Charcot's authority, and the significance of a functional neurosis ascribed to it. The traumatic neurosis then filled the positions of cerebral and spinal-cord concussions. Where we had hoped to establish a firm anatomical basis there was only an undemonstrable functional injury of the nervous system. This opinion, which comprises much that is true, was quite wrongly disseminated, and it was forgotten that traumatic nervous diseases with positive anatomical conditions—other than hæmorrhages—may exist. The experiments made by Schmaus and those of Bikelles, referred to last year, show clearly that after traumatic influences quite a variety of alterations may occur in the nervous system which very frequently require an exact and careful examination with the aid of the newest methods (of Nissl, Marchi, and others) in order that they may be recognized. As I have elsewhere asserted, ⁸_{Nov. 17, 96} though the teachings concerning the traumatic neurosis as a purely-functional disease have contributed much to our knowledge of the subject of neuropathology, it is

going too far to regard all cases formerly considered as concussions of the brain and spinal cord as purely functional. A considerable number should be eliminated from this category and referred to the class of neuropathies in which an anatomical alteration may be, at least partially, proven. It is also correct to speak of functional symptoms rather than of functional nervous diseases, which very frequently represent a disease type consisting of functional symptoms upon an anatomical basis. In the majority of apparently truly organic nervous diseases there is also a functional, psychical factor. In this way many wonderful recoveries from organic diseases of the brain (hemiplegia, for instance) or of the spinal cord (tabes) by means of hypnotic suggestion or other equally powerful and efficient suggestive methods—as, for instance, the waters of Lourdes—are explained. It will certainly not be admitted by any one that upon a simple recommendation from the physician, even in the hypnotic state, the destroyed nerve-fibres can again assume their functions. To the organic paralysis, however, another variety of functional traumatic neurosis had been added, which had aggravated the degree of the paralysis, and it is this factor alone which is amenable to suggestive influence. All purely functional symptoms or groups of symptoms relating to the nervous systems have this characteristic in common, that they rest upon a psychical basis, even when their outward manifestation is a material one,—i.e., hysterical paralysis,—and that, therefore, they may be psychically influenced. It is fortunate that the one-sided view of the purely functional character of concussion of the spinal cord is gradually giving place to a quieter and more correct opinion.—H. O.]

Dercum, of Philadelphia, ²⁴²_{Aug., '96} saw two cases of railway-spine, with autopsies. Although he could not find any alterations in the spinal cord, he is, nevertheless, of opinion that with finer methods of examination they would have been demonstrable.

[It is recommended that, in every examination of a spinal cord, the osmium stain, according to Marchi's method, be used, as this gives the best results as regards the finer changes in the nerve-fibres, always provided that the sections are still fairly fresh.—H. O.]

Diseases of the Cauda Equina.

The class of affections involving the lower portion of the spinal cord are the constant object of independent consideration, on account of their peculiar nature. Raymond, of Paris, ⁴⁵²_{Nov. 1, 2, '96} has, for instance, most fully illustrated this subject from all its stand-points. After an exceedingly detailed anatomical and physiological

description of the conditions in the conus terminalis and cauda equina he considers the symptomatology. The first and most striking sensory symptoms (when there is no question of a traumatic affection) are pains in the sacral region, extending into one or both lower extremities. These pains are rarely continuous and of varying intensity, and may be increased by percussion of the sacrum; they are boring in character. Later on anæsthesia occurs, which usually affects the mucous membrane of the bladder and rectum, the scrotum and penis, and the exterior female genitals, as well as the lower portions of the buttocks. The anæsthesia sometimes extends beyond this narrowly circumscribed region and then nearly always affects the posterior portions of the lower extremities. Paræsthesia (formication, sensation of burning or of a foreign body in the rectum and elsewhere) sometimes occurs. As motor symptoms, there are paralyses in the region of the sacral plexus (the muscles of the posterior portions of the hips and of the legs), the muscles supplied by the cruralis remaining intact. The affected muscles may atrophy. Nothing characteristic in the tendon reflexes and electrical conditions is noted. The uro-genital symptoms are, on the contrary, very pronounced. Vesical incontinence and retention alternate (ischuria paradoxa), and there is also alvine incontinence and coprostasis. The symptoms in the genital regions may be of varying nature. Attention is also directed to the frequent occurrence of decubitus at the sacrum and above the trochanters. In cases in which the lesion affects only the conus medullaris and not the true cauda equina the symptoms are limited to those above described in the uro-genital apparatus and the rectum. In the twenty-six cases known tumors were present fourteen times, and eleven were due to trauma (generally a fall upon the gluteal region). Therapeutically, the question of surgical treatment is attracting considerable attention. A case has been reported by Laquer, of Frankfort, in which the removal of a tumor outside of the dural sac resulted in complete recovery.

Raymond also describes two cases in which disease of the cauda equina may have been supposed to exist. The anatomical changes existing in the spinal cord in affections of the cauda equina and of the conus medullaris have been carefully studied by A. Souques and Marinesco, of Paris.¹¹⁵³ The case in question was that of a girl 15 years old, and an hydatid cyst was found in the vertebral canal which had completely compressed the lower portion of the conus medullaris for a space of three centimetres, as well as the surrounding region of the cauda equina. An ascending degeneration could be seen in the columns of Goll, limited in the cervical region to the dorsal portions. In the lower portions

of the cord the dorso-medial sacral fasciculus (oval field of Flechsig), as well as the ventral field of the posterior column, remained free from degeneration. In the lower dorsal cord another unaffected portion was noticeable in the periphery of Goll's columns on either side of the median line. The medullary fibres in the posterior horns had almost entirely disappeared as far as the lower portion of the dorsal cord, and the anterior horns, as well as Clarke's columns, were very poor in fibres.

Peterson, of New York, ¹_{May 11, '96} again refers to diseases in the lower portion of the spinal cord, and calls attention, in particular, to the fact that a tumor of the cauda equina may, in its early stages, simulate tabes dorsalis by presenting some of the symptoms common to both,—viz., loss of knee-jerk, disorder of the bladder-sphincters, sharp pains radiating down the legs, and peculiarity of gait. There will, however, be no ataxia, and pupillary symptoms will be wanting, while atrophies and anæsthesias are almost certain to develop in the course of time and thus demonstrate the presence of a caudal lesion.

Luxovitch, of Moscow, ²¹¹⁹_{No. 3, 10, '94} reports two typical cases of lesion of the cauda equina due to falls; in both there was retention of the urine. He is of opinion that the ano-vesical centre cannot yet, with certainty, be located in the conus medullaris.

The following case is considered by Raymond, of Paris, ⁴⁵²_{No. 2, '96} as one of hæmorrhage in the conus medullaris. The patient, who had been working for a long time in a stooping position, suddenly felt a severe pain in the lumbar region; he fell over, and very soon after lost consciousness. At first the pain persisted in all its severity, and there was frequent delirium. Later on there was some improvement and walking again became possible, and, after five weeks, he was able to leave the hospital. Constipation and retention of urine existed from the beginning, and later incontinence set in. The pains in the lumbar region only returned when the patient was obliged to stoop or upon pressure from difficult defecation. As these troubles did not improve, he again entered hospital. Here Raymond diagnosed hæmorrhage in the conus medullaris. There were no abnormal symptoms with regard to mobility, the muscles were strong and well nourished, but the tendon reflexes appeared to be diminished. The rectal and vesical incontinence persisted, and a zone was discovered in which the sensibility of the skin had greatly diminished. This hyperæsthetic zone was in the buttocks and the posterior surface of the thighs, the perineum, scrotum, and penis.

The patient of Fischer and Van Gieson, of New York, ²⁴²_{No. 2, '96} was a man, 61 years old, who, for a period of a year and a half

before the time of report, had experienced a dizzy sensation upon assuming an upright position. There was retention of urine, frequent severe attacks of diarrhœa, and loss of sexual impulse. There was no weakness nor ataxia of the upper extremities, but loss of power in the lower extremities, which had commenced about one year ago. Diplopia of three years' duration was present. The patient complained of a feeling of numbness from the waist down. No atrophy nor hypertrophy of the muscles was noted, but a gradual loss of sensation to touch and pain in both feet. The knee-jerk on the right side was entirely abolished, on the left side normal. There was a large bed-sore over the sacrum. An intra-medullary gliosarcoma three inches long was found, extending from the second lumbar segment to the cauda equina, compressing the spinal cord on the ventral side.

A number of cases which are principally interesting, anatomically, on account of the careful following of the secondary changes in the spinal cord, are published ⁹²⁷ by Dejerine and Sottas. In the first case all the nerve-roots from the fourth lumbar nerve downward were destroyed by fracture and luxation of the lumbar vertebral column. The man lived seven years after the injury. In the second case the patient was alive twenty-nine years after the accident. The spinal cord had been crushed and severed at the level of the second and third lumbar root. The third case was one of severe syphilitic disease of the spinal cord between the third and eleventh dorsal root.

An important anatomical point demonstrated was that Goll's column consists merely of the long, ascending fibres of the posterior roots, and that it contains neither short tracts nor descending branches of the posterior roots. In Burdach's column the endogenous fibres (short tracts) are mixed with the posterior-root fibres or their collaterals. In another case, examined by Dejerine and Spiller, ⁵²⁷ the patient was a woman who had suffered from painful paraplegia (principally on the right side) for eighteen months. It was supposed that there was compression of the cauda equina, and Chipault undertook an operation. A small-celled sarcoma extending from the vertebral bodies was found which had destroyed the terminal filament and all the nerve-roots from the second lumbar nerve on. It was impossible to remove the diffuse tumor, and the patient died three hours after the operation from hæmorrhage. The secondary degeneration could be followed upward throughout the posterior columns with the exception of the column of Flechsig. The authors consider, since there was a true destruction of the roots, that posterior-root fibres exist in all the other sections of the posterior column.

PERIPHERAL NERVOUS DISEASES, MUSCULAR DYSTROPHIES, AND GENERAL NEUROSES.

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General Considerations.

Philip Coombs Knapp, of Boston, ⁵_{Oct., '96} in a paper read before the Philadelphia Neurological Society, on the so-called reflex causes of nervous diseases, draws the following conclusions: 1. In the production of many neuroses the chief factor is the neuropathic state of degeneration of the patient. 2. Among hysterical patients suggestion plays an important part in the development of and recovery from symptoms. 3. Lesions of any organ may produce pain in a determined zone, but give rise to no other nervous phenomena, except as secondary phenomena of a local affection of that organ. The local affection reveals itself by the ordinary local symptoms, and the nervous phenomena are due to anæmia, exhaustion, toxæmia, etc. 4. In sundry uncommon cases lesions of a sensory nerve may give rise to epileptoid attacks. 5. Surgical operations performed to relieve nervous symptoms should never be undertaken except when absolutely indicated.

James Jackson Putnam ⁵_{Mar., '96} has studied the action of infectious processes in diseases of the nervous system. He discusses nervous diseases in which the infectious origin is undeniable (tetanus, rabies, pertussis), those in which an infectious origin is only suspected, and, finally, the causes which may render the nervous system more susceptible to infection.

B. K. Rachford, of Cincinnati, ⁵¹_{Jan. to July, '96} in a paper on some physiological factors in the neuroses of childhood, discusses the normal functions of the nerve-cells, the most important of these functions being to retain its energy. In normal children the thermogenic centres are less stable and consequently more easily excited than in adults, while the inhibitory centres are weaker, less stable, and consequently less capable of exerting a sufficient control over the thermogenic centres. In nervous and anæmic children the thermogenic centres are unstable to a greater degree than in normal children, and high and variable temperatures are common; the inhibitory centres, being also weaker than in normal

children, are powerless to prevent the discharge of force from the thermogenic centres. According to the author, the most important causes of the neuroses of childhood are a change in the quantity and quality of the blood circulating through the nervous tissues.

W. S. Christopher, of Chicago, ⁵¹_{Dec., '94} has studied the effect of incomplete nutrition of various organs in the production of neurosis, which he defines as a group of phenomena resulting from abnormal action of one or more tissues.

Allen Starr ¹¹⁹_{June 15, '95} thinks that the essential lesions, both in functional and organic affections of the nervous system, result from a change in the chemical and physical conditions of the neuron. Overwork, imperfect nutrition, or toxic agents may give rise to temporary or permanent alterations of such a nature.

Raymond, of Paris, ¹⁴_{Apr., '95} in the course of some lectures on heredity in nervous pathology, states that daily clinical observation shows the pathogenic rôle played by several factors of degeneration, especially nervous heredity. Degenerations, whether hereditary or acquired, result from disturbances in the embryo due to changes in nutrition.

Neurasthenia.

Etiology.—W. H. McLain, ⁵⁶_{July 20, '95} looks upon the usual definition of neurasthenia as erroneous, the affection consisting not in exhaustion of nervous energy, but rather in the weakening of the means of transmission of that energy. Neurasthenia cannot be understood except by a study of the connections between mind and body. When the origin of thought is well known, as well as the molecular changes produced in the gray substance of the cerebrum, it will be possible to describe the pathology. Theodore Diller, of Pittsburgh, ¹¹²_{Mar., '95} states that, though looked upon to-day as an idiopathic affection, it may be said to be determined by three causes: exhaustion, anæmia, and poisoning of the nervous centres. François Boissier, of Paris, ⁹⁹⁶_{Feb. 28, '95} studied the neurasthenia of depression and melancholia, considered with reference to their reciprocal relations. He looks upon neurasthenia as an attenuated melancholia capable of progressing until it becomes true insanity if certain conditions exist. It is difficult to say where the one ends and the other begins. In all cases an early diagnosis and active treatment are necessary, and they may be considered prophylactic against melancholia. Patricopoulo, ⁹⁹⁶_{Nov. 10, '94} in a paper based upon six observations, one personal, demonstrates that neurasthenia may be produced by traumatism in the absence of all hereditary factors. Neurasthenia of traumatic origin is sometimes not to be distinguished from other forms of neurasthenia. Sometimes it manifests

itself by local phenomena, and more especially by symptoms of paralysis in the lower limbs. After a period of incubation the disease develops by autosuggestion, and by suggestion only can it be treated.

Pardon, of Lyons, ²¹²_{Feb. 25, '95} studied the forms of neurasthenia of cardiac origin. The phenomena which the patients manifest are almost exclusively neuropathic in nature, and at first sight would seem to belong to a purely nervous affection. It is accordingly necessary, in order to ascertain the cause, to carefully examine the heart. Rest and a suitable mode of life are the most important factors in treatment. Régis, of Bordeaux, ³_{Aug. 10, '95} thinks that neurasthenia is often allied to arterio-sclerosis. In such case the indicated treatment is that of arterio-sclerosis.

L. L. Petit, of Paris, ¹⁰⁰_{Oct. 2, '95} having noted a relation between neurasthenia and sclerosis, as well as various other deformities, advises treatment, first, of the general condition, then of the nervous system, avoiding causes of overexcitement and employing such moral and medical means as would tend to calm it; treatment of dilatation of the stomach if this exist, and, finally, treatment of deformities that may be present. In addition, douches, massage, electrical treatment of wasted muscles, and appropriate gymnastics should be advised.

Merliér, of Paris, ¹²⁶_{July 15, '95} states that neurasthenia may be noted at any period of syphilis, following the mental shock or depending upon the infection itself. At times it is caused by badly-directed or too rigorous treatment.

Isnel, of Abries, Hautes Alpes, describes the case of a shepherd, aged 43 years, suffering from epileptic attacks, who by medical advice took bromides fasting. His stomach became affected, and neurasthenia, with cephalalgia, insomnia, muscular depression, and unreasonable fears developed. The epileptic attacks disappeared when the neurasthenic phenomena developed.

A. Fournier, of Paris, ⁵⁵_{June 22, '95} calls attention to the fact that syphilis is not the only disease likely to produce cephalalgia among syphilitic patients. Neurasthenia being a frequent sequence of syphilis, neurasthenic cephalalgia is met with in infected individuals, and is to be distinguished from syphilitic cephalalgia by the lesser intensity of the pain; it is rather a derangement of the head, painful feelings of weight, of heaviness, of constriction, of vagueness, of emptiness of the brain. While syphilitic cephalalgia is marked by its nocturnal character or its nocturnal exacerbations, neurasthenic cephalalgia is almost always diurnal; it begins on awakening and lasts throughout the day, but seems to diminish toward night. Specific treatment is without the slightest

effect upon cephalalgia of neurasthenic origin. Finally, even the period of duration of the headache suffices to confirm the diagnosis. Cephalalgia dating several months back, and even several years back, can be nothing but neurasthenic cephalalgia, and the only treatment with which to meet it is that of neurasthenia itself.

Symptomatology.—Charles L. Dana, of New York, ⁶¹_{Jan. 24, '96} describes a new variety of neurasthenia under the denomination of “angio-paralytic neurasthenia.” Besides the usual phenomena of neurasthenia the patients experience a general pulsation of arteries, extending over the entire body, though more marked in the head. The author attributes this phenomenon to general relaxation of arterioles and capillaries, the blood being driven into vessels which have lost their elasticity. It is as if a liquid were impelled through a series of tubes with flaccid walls.

Freud ²⁴²_{Mar., '96} separates from neurasthenia a group of nervous phenomena which he denominates “anxiety neurosis.” It presents the following symptoms: (1) general irritability; (2) anxious apprehensions and exaggerated importance assigned to the most ordinary events; (3) attacks of anxiety, with palpitations, perspiration, dyspnœa, boulimia, etc.; (4) nocturnal frights; (5) dizziness; (6) causeless fears; (7) nausea, diarrhœa, and, at times, tenesmus of bladder; (8) paræsthesia and hypersensitiveness to pain.

Mesnard, of Bordeaux, ²¹²_{Jan. 10, '96} has observed a patient, aged 52 years, suffering from neurasthenia, who, for more than twenty years, has been the victim of abundant hæmatemesis, which occurs simultaneously with a neurasthenic attack.

Treatment.—Græme M. Hammond ²⁴²_{Nov., '94} advises neurasthenic patients to take a small amount of alcohol at their most important meal. He long prescribed a glass of Bordeaux wine; he now prefers coca preparations, which produce greater effect, both as tonics and stimulants of the nervous systems. Maltine and coca-wine form a mixture pleasing to the taste which can be given with good result. G. M. Ransom, ¹⁵_{Jan., '96} regarding the symptoms of neurasthenia as most likely due to the ischæmia and lack of nutrition of certain regions, advises thermo-therapeutic treatment.

Imbert de la Touche ⁷²⁰_{Aug., '96} advances the following propositions: 1. Neurasthenia is most often characterized by arterial hypotension. 2. From studies made upon electricity and hypodermatic treatment these agents may be said to have an indisputable action in raising arterial tension. 3. Electricity restores the forces of the system, while hypodermatic treatment would seem to have an elective effect upon the mental state. 4. The two methods used together produce therapeutic results which are lasting and more thorough than when either is used singly. 5. This new method is

superior to all other treatments of neurasthenia with arterial hypotension; it allows the suppression of drugs given by the stomach, which are badly borne by the patients and injurious to the digestive processes. 6. Its object is to increase the patient's strength by hastening the nutrition; with the addition of suitable hygienic measures it becomes the method of choice in the treatment of so refractory an affection.

H. J. Vetlesen ^{369, 90}_{Mar., '95, May} publishes four observations of neurasthenia treated with hypodermatic injections of a liquid extracted from cerebral matter, a dose of 3 cubic centimetres (46 minims) being injected three times weekly. In two patients there was marked improvement.

James J. Putnam, of Boston, ⁹⁹_{May '95} recommends a psychical treatment of neurasthenia, chiefly consisting in helping the patient to master the disease by exerting his reason and his will. The mental state may likewise be influenced, apart from the direct intervention of his own will, by the hypnotic method. Osgood has often had recourse to suggestion. He has observed that certain drugs, such as digitalis and iron, become very useful through suggestion, and at once produce a marked effect. Prince believes that the majority of drugs which show favorable results in neurasthenia do so through the psychical element. The wonderful results obtained by such or such physician are due to his personal influence upon the patient. Van Eeden and Van Reuterghem, ^{241, 1126}_{Dec., '94; Feb., '95} out of 99 neurasthenic patients treated by psychotherapy, obtained 35 improvements and 21 recoveries.

Claus, ^{1160, 673}_{June 30, '95; Aug., '95} considers trional as the best and least dangerous of hypnotics against the insomnia of neurasthenia. A dose of 1.50 grammes (23½ grains) usually suffices.

Geley ¹⁸⁶_{Aug., '95} recommends the following preparation:—

R Coca-wine,	.	.	.	1 litre	(1 quart).
Tincture of nux vomica,	.	.	.	2.5 to 5 grammes	(88 to 75 minims).
Extract of quassia,	.	.	.	5 grammes	(75 minims).

M. Sig.: A small wineglass at each of the two principal daily meals. Two or three glasses of milk are also to be given during the course of the day.

Neuritis.

Etiology.—Philip Meirowitz, of New York, ¹_{Mar., '95} cites the case of a child, aged 9 years, who, after ingestion of a large dose of arsenic, presented symptoms of acute poisoning. Toward the end of the third week violent pains occurred in the legs, then in the feet, but not in the arms, though there was itching of the hands; he rapidly lost the power of walking without crutches. When brought to see Meirowitz his gait was ataxic, the feet cyanotic and cold, the feet, legs, and hands painful to pressure; there was invol-

untary contraction and quivering of the calf-muscles, loss of plantar, patellar, and cremasteric reflexes, tactile anæsthesia of feet as far as just above the malleoli, and a zone of hyperæsthesia two inches higher; anæsthesia to heat and cold in the feet and hyperæsthesia toward the lower part of the leg; reaction of degeneration. Treatment consisted in the use of induced currents and static electricity and strychnine sulphate.

A patient of Barr's¹⁵ Aug. '96 had taken large doses of arsenic for serious pernicious anæmia. A month later symptoms of neuritis appeared, and soon he could not stand erect. The arsenic was stopped and the anæmia rapidly disappeared, but the neuritis of the lower limbs persisted. Cecil Purser, of Sydney,²⁶⁷ June 15, '96 calls attention to two cases of arsenical poisoning causing peripheral neuritis. One of the patients recovered, the other died. Alfred R. Parsons, of Dublin,¹⁶ Sept. '96 cites the case of a woman in whom the application of an arsenical blister to a tumor of the breast caused multiple neuritis with almost complete paralysis of the forearm and hands, loss of power in arms and impotence of lower limbs, with severe pains, hyperæsthesia, abnormal sensations in the limbs, and loss of reflexes.

Glynn² Apr. 4, '96 observed, in a young man of 16 years, a toxic neuritis caused by carbonic-oxide gas. The patient's condition improved rapidly under the influence of potassium iodide and warm fomentations applied to the legs.

Spillmann and Etienne, of Nancy,¹⁴ Aug. 14, '96 noted three cases of acute mercurial poisoning with symptoms of polyneuritis. These symptoms of polyneuritis are clearly to be distinguished from those of chronic mercurial poisoning. In the acute form pain, atrophy without reaction of degeneration, and diminution of reflexes are to be observed. In the chronic form there is localized neuritis, without atrophy, and with preservation of reflexes.

Churton, of London,² Nov. 1, '94 records the case of a young girl of 14 years who died in six days from multiple neuritis. Analysis of the drinking-water used by her revealed a considerable amount of lead.

Reformastsky, of Kazan,³¹ June 19, '96 had under his care, almost simultaneously, eight members of the same family suffering from peripheral polyneuritis secondary to infectious troubles allied to influenza.

Trouillet and Vallet, of Grenoble,³¹ Mar. 22, '96 observed a case of neuritis following influenza, affecting the brachial plexus, of which all the branches were affected to a greater or less extent.

A. W. Stein²⁴⁵ Oct. '94 treated a patient, aged 48, who, infected by syphilis in March, 1893, showed, toward the end of August,

symptoms of acute polyneuritis and who died toward the middle of September.

Gaucher, of Paris, ¹⁴_{Apr. 21, '96} reported the case of a woman, aged 54 years, affected with syphilitic neuritis of the ulnar nerve. Secondary accidents had come on rapidly, there being tingling, numbness of the region animated by the right ulnar nerve, with much loss of strength in the hand. Sensation was absent throughout the territory innervated by the ulnar nerve; the dynamometer, which indicated 35 for left hand, gave but 11 for the right side. The neuralgia disappeared after a daily injection of benzoate of mercury, but the muscles of the hand wasted, though this atrophy soon ceased to progress. Panas, of Paris, ³¹_{Mar. 2, '96} observed a case of optic atrophy of gonorrhœal origin.

Catrin ¹⁴_{Jan. 12, '96} saw a case suffering from neuritis of malarial origin. While serving as a soldier in the Soudan he had been attacked by fever, at first remittent, then tertian; two months later he had had an attack of pernicious fever of comatose form; on coming to, forty-eight hours later, there was almost complete amnesia, which disappeared slowly. There were at the same time singular disturbances of the lower limbs; in the left leg exceedingly sharp pains along the course of the sciatic nerve; in the right leg less marked pain, but complete paralysis of leg and foot, and in addition the sole and dorsum of foot were the seat of such intense hyperæsthesia that the patient could not place his foot on the ground without crying out with pain. He was sent home and placed under Catrin's care. The right foot was deformed, being in a talus position with a slight amount of varus; the toes were strongly flexed and claw-shaped; the sole and dorsum of the foot were without sensation. Incomplete reaction of degeneration was present. There being no history of alcohol, lead, syphilis, or beriberi, a diagnosis of malarial peripheral neuritis was necessarily made.

Fraser and Bruce ²_{May 25, '96} describe the case of a man, aged 36, suffering from diabetes and tuberculosis, who showed symptoms of multiple neuritis. At the autopsy lesions of the cord and optic nerves were found. A. Lunz, of Warsaw, ¹⁸_{Sept. 15, '96} divides puerperal neuritis, with reference to the etiology, into three groups: (1) pyæmic, or septic; (2) cachectic; (3) a variety having its starting-point in the mental trouble, induced by childbirth, resembling puerperal psychoses which develop without puerperal infection.

H. Riley, of Bowie, Texas, ⁸⁵_{June, '96} was called to see a boy, aged 14, who had been stung by a centipede at the level with the seventh cervical vertebra. The patient showed almost immediate symptoms of poisoning. The appearance was that of alcoholic

delirium,—injected eyes, tonic contractions of dorsal muscles, and of muscles of legs and arms. Several strong men were required to keep him in bed. No rise of temperature or respiratory or circulatory disturbances were present. There was great mental irritability. From the fourth day onward a distinct aura was noted, starting from the lumbar region and traveling to the head, followed by a status catalepticus lasting from five to twenty minutes, and ending in convulsions. The twelfth day the aura vanished, but the convulsions persisted. Toward the fifteenth day paralysis of sphincters of anus and bladder were noted. The patient died. Riley remarks that the bite of the centipede is not usually looked upon as mortal; however, in this case, it gave rise to neuritis terminating fatally.

F. H. Stevenson ^{June 8, '96} calls attention to the neuritis due to external causes. From his point of view, 90 per cent. of all cases of neuritis are due to the action of cold. The inflammation exerts its principal effect upon the sheath of the nerve; the nervous tissue itself is affected only in serious cases. The symptoms are principally local ones; the most marked one is pain in the inflamed portion of the nerve, and often, also, in the region to which it is distributed. Sometimes there is pain of the whole limb, increased on motion, compression or tension of the nerve, and by anything which may bring about passive congestion of the limb. If the nerve can be directly examined it may sometimes be felt to be swollen. The skin which covers it is at times of a reddish hue. The muscles which receive the nerve-endings are weak, sensitive, and present fibrillary contractions. There are characteristic reactions of disturbances of nerves. Trophic troubles exist. Slight acute neuritis may disappear in a few weeks; more commonly the affection lasts for months. Whatever be the treatment employed, absolute rest of the limb is necessary.

Grouillet, of Grenoble, ^{Jan. 2, '96} saw a case of neuritis following fracture of the scapula, with paralysis of the angularis, rhomboideus, trapezius, pectoralis major and minor, and serratus magnus muscles.

Derville, of Lille, ^{Dec. 1, '96} described a case of spontaneous acute multiple neuritis in a man aged 33. No hereditary nervous taint nor history of past disease could be ascertained. Gastric troubles showed themselves first, with constipation, colic, vague pains, discomfort, and loss of power in the legs. Somewhat later the patient felt in the extremities of hands and feet a sensation as of numbness from cold, the fingers and toes taking on a bluish hue. The numbness extended toward the roots of the limbs and the muscular weakness made rapid progress. At this moment a complete

double facial paralysis appeared. Bulbar phenomena now showed themselves and death from asphyxia ensued. Derville calls this case one of spontaneous neuritis, because he found neither infection nor toxæmia to explain it.

Diagnosis.—George J. Preston, of Baltimore, ⁹_{Oct. 2, '96} calls attention to the difficulties of diagnosis in cases of multiple neuritis of long standing. Ordinarily no disturbances of sensibility are found, while motor paralysis may be exceedingly pronounced. From a clinical stand-point the author describes three forms: (1) atrophic; (2) paralytic; (3) tabetic. Louis Faugères Bishop, of New York, ²⁴²_{July, '96} discusses the differential diagnosis between local neuritis, rheumatism, neuralgia, diseases of central nervous system, and neurasthenia. His conclusions are that the characteristics of the pain have not much importance from that stand-point, and that the best diagnosis will always be made by exclusion.

R. K. Macalester ²⁴²_{Nov., '96} had under his care a male patient, aged 19, who had been unsuccessfully treated for several weeks for rheumatic pains in the arms and legs. Macalester thought the case might be one of multiple neuritis and undertook the following treatment: A daily dose of 10 grains (0.65 gramme) of calomel and $\frac{1}{8}$ grain (0.002 gramme) of strychnia sulphate, which, little by little, was increased to $\frac{1}{2}$ grain (0.003 gramme); massage, good diet, and faradic current. Success followed the treatment. William C. Krauss ²⁰²_{Aug. 20, '96} was consulted by a man, aged 32, who had been ill for more than a year and who had been treated without benefit. The author found him to be suffering from neuritis of the brachial plexus, producing paralysis of the muscles innervated by the fifth and sixth cervical nerves.

Pathology.—Seymour J. Sharkey, of London, ⁶_{Aug. 10, '96} questions whether a too strict line of demarkation has not been drawn between the peripheral nervous system and the central nervous system. Have we not gone too far when limiting to the nerves the lesions in certain affections of which the causal agents can likewise alter the nervous centres? Poisons—such as alcohol, lead, or the infectious agents of certain diseases—can certainly produce extensive lesions of the central nervous system to the same degree to which they affect the peripheral nerves.

A. Goldscheider and Moxter, of Berlin, ⁵⁴_{July, Aug., '96} cite the cases of two patients suffering multiple neuritis in whom medullary lesions were found at the autopsy. The authors admit that influences apt to produce peripheral neuritis are also apt to bring about a central neuritis, or, in other words, alterations of the expansions of the neurons may extend to the central portions of said neurons.

A. Scherback, of Ivanow, ³_{Sept. 11, '96} showed, in a man suffering from hysteria and polyneuritis of the regions innervated by the median nerve of the right side, tactile polyæsthesia and macroæsthesia. Any object touched by the patient with the first three fingers of the right hand appeared to be multiple and larger than in reality. The increase in number and in size of the tactile impressions varied between a double and the fivefold enlargement. There was simultaneous diminution of cutaneous sensibility, with considerable loss of muscular sensibility.

Symptomatology.—Max Levy-Dorn ⁴_{Sept. 12, '96} describes the case of a man, aged 52, who, toward the beginning of August, 1893, noticed a certain degree of numbness in the fingers when his arm was hanging down. Toward the middle of the same month the member began to swell, and pain was present at the inner side of the arm and the upper part of the forearm, increased by movements of the elbow-joint. Treatment consisted in galvanism and massage. After a month's time the swelling had lessened and the nerves could be distinctly felt to be thickened in the groove of the biceps. In October the patient was able to resume his work. There was no history of syphilis nor alcohol, but the preceding year the patient had suffered from influenza, followed by articular rheumatism. Mons ²⁴³_{Oct., '94} quotes a case of peripheral neuritis of ataxic form, with loss of power in the lower limbs, paresis of the upper limbs, especially on the right side, uncertain gait, and loss of patellar reflex. Recovery ensued.

Leyden ⁵_{Dec., '94} had under his care, in May, 1893, a woman of 27, suffering for sixteen months from inability to move, diminished memory, and obscured intelligence. There were wasting of extensor muscles and loss of knee-jerk. Leyden, finding no adequate cause for the affection, supposed it to be a multiple neuritis of rheumatic origin, and began a treatment in accordance,—gymnastics, electricity, hypodermatic injections of strychnine. Recovery took place in ten days.

J. T. Eskridge, of Denver, ⁹_{Dec. 22, '94} observed in a colored man, aged 50 years, a multiple neuritis during the progress of which unilateral facial paralysis appeared nine months after the onset of the neuritis. Eskridge thought there was no connection between the two; the paralysis was but a local accidental neuritis, in no way modifying the general prognosis. On the other hand, a facial paralysis coming on during the acute period of multiple neuritis would be of bad omen.

R. Colella ⁹⁹⁶_{Jan. 28, '96} publishes a work on polyneuritic psychosis, with 35 observations, of which 8 are personal. Amnesia is the principal symptom in the pathological aspect of the malady.

George S. Middleton, of Glasgow, ²¹³_{Oct., '94} observed a case of bilateral peripheral neuritis, characterized by paresis of arms, legs, and both sides of the face, disturbances of sensibility and loss of reflexes, with dyspnoea, weakness, gastralgia, and constipation. The galvanic current and nux vomica were employed. The parts first affected were the last restored.

Treatment.—James Cagney, of London, ²⁶_{Apr. 1, '96} is of opinion that the majority of cases of neuralgia are dependent upon neuritis. The principal causes are anæmia, rheumatism, gout, toxæmia, lead poisoning, malaria, syphilis, and diabetes. The general treatment should accordingly be directed against one of the above causes, according to the case. Neuritis being a local affection, local treatment is of great importance. For example, if a sciatica be in question one should first endeavor to discover the cause, whether gout, diabetes, compression, or something different; but, while employing such measures as may act against the cause, one should strive to relieve the pain and to revive the nerve. Rest in the most advantageous position is the chief local measure. Uniform warmth should be kept up around the affected part. Warm fomentations are sometimes successful. Local irritation is often useful (sinapisms, blisters, etc.). Hypodermatic injections of cocaine are to be used with prudence. The author advises galvanic currents, which, judiciously applied, relieve the pain and arrest the degeneration of muscles.

Hunter McGuire, ²²_{Mar. 27, '96} being consulted by a man who complained of violent pain in the region of distribution of the inferior dental branch of the inferior maxillary nerve, decided, after various unsuccessful treatments, to cut out the nerve. Relief was immediate. Some weeks later the patient returned, complaining of pain in the region innervated by the lingual nerve. Mastication was exceedingly painful, and violent paroxysms were felt whenever the patient swallowed, spoke, or moved his tongue. McGuire covered the positive pole of a galvanic battery with a piece of absorbent cotton-wool saturated with a 10-per-cent. solution of cocaine hydrochlorate; he placed the pole inside the patient's mouth, the negative pole being applied to the exterior surface of the cheek, and turned on a current of 5 milliampères for five minutes. The pain vanished at once and did not return for twenty-four hours. Two sessions a week were given from that date with much improvement.

A. Stodart Walker, of Edinburgh, ²_{Dec. 22, '94} treated three cases of peripheral neuritis by injections of strychnine. While other treatments had been ineffective, an immediate amelioration followed the hypodermatic injections, and the patients recovered.

Delorme, of Paris, ¹⁴_{May 22, '96} has recourse, in cases of traumatic neuritis, to forced pressure of the most painful points after anæsthesia by chloroform. This method he has used with success in ten cases, and he compares it in efficacy to neurotomy or neurectomy. Forced pressure has the advantage of requiring neither operative skill nor accurate anatomical knowledge.

Neuralgia.

Etiology and Pathology.—Albert Josias, of Paris, ²²_{Jan. 16, '96} cites the case of a woman of 60 years, who for eight years had suffered from spasmodic neuralgia of the left side of the face. There was excessive sensitiveness of the edge of the gums on the same side (the patient had lost almost all her teeth). Josias, recalling the eighteen cases of recovery in intractable neuralgia obtained by Jarré after removal of the mucous membrane, periosteum, and a portion of the osseous tissue from the most sensitive point, requested the latter to operate upon the patient. Pain ceased the very same day and has not since returned.

Charles Cary, of Buffalo, ¹⁹_{Feb. 1, '96} describes the case of a man of 48 years, who complained of sharp pains in the popliteal space, and who could not extend the thigh. At a point equally distant from the tuberosity of the ischium and from the great trochanter slight pressure gave rise to fever. The symptoms were indicative of sciatica, but some days later Cary could induce movements of the leg and thigh without giving rise to pain, and the patient felt himself to be more comfortable with the thigh slightly flexed upon the abdomen than when it was in the normal situation,—a symptom which does not occur in sciatica.

S. Erber, of Vienna, ²_{Mar. 20, '96} in a paper upon the vasomotor phenomena of sciatica, observes that the temperature of the affected leg is lower in certain regions than it is in the healthy limb. The case is in contrast to the observation of Erb, who noted redness and warmth with increase of perspiration and alternations of heat and cold. Erber thinks that in sciatica the inhibitory, or special, vaso-dilator fibres are paralyzed, causing vaso-constriction.

Roth, ¹⁴_{Jan. 1, '96} gave an account of fifteen cases of a peripheral nervous affection localized in the area of distribution of the external cutaneous nerve, applying to these cases the name of "external paræsthetic neuralgia." The chief symptoms are pain, paræsthesia, and anæsthesia of the external aspect of the thigh. It is found chiefly among males suffering from various disturbances of the circulation (hæmorrhoids and varicose veins) and who lead a sedentary life. Roth believes the symptoms are due to pressure upon the nerve where it passes by the antero-superior spine.

Destot, ²¹¹_{Sept. 8, '96} gave an account of a man of 57 years, who, after an accident on a tramway, became affected with paræsthetic neuralgia of the external cutaneous nerve.

W. F. Arnold, ⁹_{Aug. 1, '96} publishes three cases of rectal neuralgia. One of the patients, when suffering from an attack, would be in a state of great depression, exceedingly pale, covered with perspiration, and with a hardly-perceptible pulse. The author thinks that like attacks might cause death, if sufficiently frequent.

Schreiber, of Vienna, ⁸¹⁴_{June 5, '96} advises much care in the examination of individuals complaining of sciatic pains and asking for treatment. The affection may be due to some abdominal tumor pressing upon the nerve. Usually, when treatment for supposed sciatica is without effect after six weeks' time, the symptoms depend upon incipient tabes dorsalis, an abdominal tumor, or strangulation of the nerve where it leaves the pelvis.

Treatment.—Julius Althaus, of London, ²²_{Feb. 20, '96} insists upon the beneficial effect of the constant current in intractable neuralgia. In tic douloureux he proposes introducing cocaine or aconitine into the affected part by means of this current.

J. Newton Hunsberger, ⁸⁰_{Aug. 16, '96} successfully treated fifty-seven cases of neuralgia by aconitine. No untoward symptoms were noted at any time, either loss of appetite, constipation, nausea, dryness of throat, or headache. The author thinks that the remedy merits greater attention than has so far been given it.

According to Frank Billings, ¹⁰⁵²_{Sept. '96} the treatment of intercostal neuralgia should be either palliative or radical. Among palliative measures may be included mustard poultices, chloroform liniments, blisters quickly removed, dry cupping, or even the actual cautery. Radical treatment should be directed to the cause, since intercostal neuralgia is not a disease, but a symptom.

Mikhalkine, of Nijni Novgorod, ¹⁰⁸_{Feb. 15, '96} successfully treated three obstinate cases of sciatica with trinitrin prescribed in the following form :—

R	Solution of trinitrin diluted to $\frac{1}{160}$.	2 grammes ($\frac{1}{2}$ drachm).
	Tincture of capsicum,	6 grammes ($1\frac{1}{2}$ drachms)
	Mint-water,	12 grammes (3 drachms)

M. Sig. : Three drops to be take three times daily.

B. Buxbaum ⁴⁵¹_{Mar. '96} recommends the hydrotherapeutic treatment of neuralgia. When the latter is of rheumatic origin the treatment acts by drawing the blood to the affected parts, and when it is of infectious or toxic origin by provoking elimination of the morbid product. The author advises the alternate use of hot and cold water.

Debove and Bruhl, of Paris, ¹⁰⁰_{Mar. 20, '96} advise hypodermatic injec-

tions of artificial serum in sciatica, the following formula being used by them:—

R Sodium sulphate,	.	.	.	.	5 grammes (75 grains).
Sodium chloride,	.	.	.	.	5 grammes (75 grains).
Water,	.	.	.	.	1000 grammes (1 quart).

No local symptoms, but almost always slight rise of temperature was noted.

Grandclément ⁶⁷³_{Apr. '96} proposes the treatment of tic douloureux by hypodermatic injections of the following solution into the affected part:—

R Cocaine hydrochlorate,	.	.	.	0.03 gramme ($\frac{1}{2}$ grain).
Antipyrin,	.	.	.	4.00 grammes (1 drachm).
Distilled water,	.	.	.	10.00 grammes (2 $\frac{1}{2}$ fluidrachms).

By this method he cured two cases.

Pont ²¹¹_{July 14, '96} showed to the Lyons Medical Society a patient who for two years had suffered from epileptoid neuralgia of the left trigeminus. Under the influence of hypodermatic injections of hyoscine pains ceased and the attacks of contracture diminished, both as to frequency and length. The injections were made either into the cheek, at the painful spot, or into the arm, and four days' treatment was alternated with four days' rest. The strength of each injection was 0.0002 gramme ($\frac{1}{2500}$ grain) of hyoscine hydrochlorate.

Migraine.

Etiology.—Bresgen, of Vienna, ³¹⁹_{Dec. 25, '94} recognizes the following causes of nervous headaches in children: (1) asthenia due to acute and chronic diseases, (2) chronic indigestion due to faulty feeding, (3) intellectual overwork, (4) reading and writing by a poor light, and (5) affections of the nose, eyes, and ears.

Bum, of Vienna, ¹⁰⁸_{July 1, '96} admits, with Henschen, Nordström, and Rosenbach, that hemicrania is a rheumatic affection of the scalp-muscles and of some of the muscles of the face and neck. In seventeen patients he found thickening of the muscles of the scalp, as noted by these writers. The attacks disappearing after the re-absorption of the infiltrations, Bum advises medicinal treatment and massage, friction being kept up from five to ten minutes at first, then from ten to twenty minutes. The author has also tried shock-massage, and, in order to have the shocks of equal intensity, employed Liedleck's vibrator.

Head ²_{Oct. 27, '94} claims that every organ is in connection with one or more external zones to which pain is transmitted and where the integuments become sensitive. The author gives a list of these

regions, of their point of maximum intensity, and of the organs to which they correspond.

J. S. Shibley⁵⁰⁶_{Aug., '96} divides cephalalgia into organic, reflex, toxic, and constitutional varieties. Organic cephalalgia is due to some affection or injury of the cranium or its contents, reflex cephalalgia to extra-cranial affections or lesions, toxic cephalalgia to certain poisons, and constitutional cephalalgia to defects, either congenital or acquired, in the nervous organization, to faults in nutrition, and to conditions dependent on diatheses. The treatment of organic and reflex cephalalgia should be that of the local cause giving rise to them, while the treatment of constitutional cephalalgia may be either palliative or radical, according as one endeavors to treat the attack itself or prevent its recurrence. In the first case drugs are to be employed, in the second hygienic measures.

Symptomatology.—H. C. Wood, of Philadelphia,⁹_{Dec. 29, '94} treated a young man of 20 years, who for several years had been subject to attacks of a peculiar nature. He would begin by seeing on his right hand a bright star, from six to eight feet distant; this apparition would last from five to fifteen minutes. The disappearance of the star was attended by the bright shining of a white light similar to that of an incandescent electric light; this white light would zigzag around the star, but at a certain distance from it. The star would then be replaced by a black spot, which would go on growing larger and larger for about fifteen minutes, until it covered the entire visual field. A violent cephalalgia in the temporal region would then attack the patient, with gastric disturbances, sensation of weakness, and general depression, lasting from two to three hours and terminating by loss of consciousness, during which the patient would froth at the mouth and bite his tongue. The author looks upon the case as one of epileptoid hemicrania.

A. Bary⁵_{July, '96} gives the history of a woman, aged 51, who, since the age of 9 years, had suffered from attacks of hemicrania occurring every three or four weeks. Suddenly the hemicrania vanished and was replaced by pain in the epigastric region, coming on almost every day and even several times a day; the termination of the attacks was marked by eructations. After three months the gastric disturbances disappeared and the headaches re-appeared. Two years later the same phenomena occurred. No signs of any gastric affection, of hysteria, or neurasthenia could be discovered. Bary assigns these gastric attacks to a different localization of an identical morbid process.

Collignon, of Maubert-Fontaine,²¹²_{Apr. 10, '96} has often noted in young children symptoms which he attributes to hemicrania. During the night or in the morning on awakening frequent

attacks of vomiting occur, lasting from one to three days. Prostration, narrowed pupils, loss of color, and slight rise of temperature accompanied by increase in respiration are noted. The patient dreads noise and light. The symptoms cease suddenly, but re-appear about every three or four months. If the hereditary antecedents are looked into, nine times out of ten it is found that these children are descended from patients subject to hemicrania.

Treatment.—Claus²_{Nov. 24, '94} distinguishes three forms of hemicrania,—simple, ophthalmic, and ophthalmoplegic. As to treatment, he advises, above all, as a prophylactic, to avoid fatigue, hunger, mental overwork, cold, and constipation, and recommends a strict diet as well as rest after meals. Antipyrin is to be given in doses of from 1 to 1.5 grammes (15½ to 23½ grains) for a woman, from 1.5 to 2 grammes (23½ to 31 grains) for a man. Trional also gives good results; sodium salicylate is to be given in from 4- to 6-gramme (1 to 1½ drachms) doses in hemicrania of arthritic origin. Potassium bromide is preferable in ophthalmic and ophthalmoplegic hemicrania.

B. K. Rachford, of Cincinnati,¹⁰⁸_{Dec. 16, '94} attributes hemicrania to an auto-intoxication by uric acid. In addition to Haig's dietetic treatment (suppression of wine, beer, liquors, and meat), he recommends sodium phosphate, sodium salicylate, or Carlsbad salts, but especially potassium permanganate.

Charles E. Lockwood¹_{Dec. 15, '94} attended a woman of 45 years who for ten years had suffered from headache. Attacks occurred twice a week and were preceded by a chilly sensation with dryness and tickling in the nostrils. Extract of cannabis Indica was administered three times daily, before meals, in doses of ¼ grain (0.01 gramme), the dose being increased ¼ grain every seven days until it reached ¾ grain (0.03 gramme), ½ grain (0.012 gramme) arsenious acid being added. The eyes were examined and suitable glasses prescribed. Under this treatment the attacks of hemicrania diminished in frequency and finally ceased.

Chorea.

Etiology and Pathology.—Osler, of Baltimore,⁷⁷_{Aug. '98} has examined 140 individuals suffering from chorea for at least two years. In 51 the heart was normal; 72 presented symptoms of an organic lesion, and the other 17 cardiac disturbances which might be looked upon as functional. Of the cardiac patients who had suffered from chorea, 66 per cent. had not had rheumatism. Osler concludes that the cause of chorea must be attributed to an infection allied to rheumatism, but differing from it, however.

According to Arthur Conklin Brush,¹_{Mar. 9, '98} chorea is an affection

of the cerebral cortex, acting mainly upon the superficial layers and manifesting itself by a loss of the control possessed by the sensitive areas over the motor areas. So long as the motor cells are not affected the movements appear intentional, but when the lesion extends to these cells irregular and individual contractions of muscles or parts of muscles occur.

A. Breton, ⁶_{Nov. 17, '94} in an article on mental status in chorea, concludes that chorea is an affection essentially characterized by motor troubles. The mental disturbances may be divided into two groups: first, those causing an alteration in the moral sensibility, character, intelligence, memory, and affections; the second gives rise to unknown fears, hallucinations, and choreic insanity. The symptoms of the first group are so common that they may be included among the habitual symptoms of chorea. Nocturnal fears and hallucinations are rather uncommon, and choreic insanity quite exceptional. Hallucinations are noted almost entirely at night, on going to sleep; they may be prolonged during the night, and either interrupt or prevent sleep. Those of the sight predominate, those of audition, of taste, of smell, and of touch being less common. Hallucinations of the genital sense are an exception. Choreic insanity may show itself under the form of attacks of simple mania, of mania with hallucinations, or may appear as melancholia with painful fancies and tendency to suicide. Recovery from this mental state is the general rule in acute chorea; brought about by chorea, it ceases with it. The neurosis may, however, open the way to moral degradation, to mental alienation, or to dementia. Heredity is the only true cause of psychical phenomena in chorea; they are but aroused, and not created, by the disease.

Mérigot de Treigny, of Paris, ²⁵_{Jan. 19, '96} believes that a patient suffering from chorea may be affected, during the acute stage of the disease, by complications apt to endanger life or to bring about lasting cardiac alterations; he is likewise exposed to recurrence of the disease, and complete recovery can only be obtained when the patient is free from any neurotic taint; on the other hand, if the opposite be the case the disease may leave behind it a lasting mental weakness, or may even pave the way to the mental affections of the degenerate.

Giovanni, ¹⁴_{July 21, '96} advances the theory that chorea is provoked by an hyperexcitable state of the nervous system, attacking only those who are predisposed to it.

George F. Johnston, of London, ⁵_{Oct. '96} maintains that the existence of a real hereditary chorea is exceedingly doubtful or, at least, has not yet been well established.

Heinrich Meyer, of Berlin, ³⁶⁶_{May, Aug., '96} insists upon the infectious origin of chorea minor. Chorea is frequently the equivalent of an attack of polyarthrititis or follows an attack of rheumatic fever instead of a relapse. Other rheumatic outbreaks may occur at the same time (lesions of the endocardium, of the joints, etc.). In one case of chorea, terminating in death, bacteriological examination showed the presence, in the blood and other organs, of a large quantity of pyogenic micro-organisms (*streptococcus pyogenes*, *staphylococcus pyogenes citreus*), which have also been discovered in the pathological products of rheumatic fever. The author thinks that the chorea of pregnancy is also of rheumatic origin.

Calvin P. Barber ¹⁹_{Mar. 22, '96} believes that the mortality in chorea is much higher than is generally believed. He has seen several fatal cases and has had occasion to perform an autopsy which revealed no lesion apt to explain the symptoms.

Atypical Forms.—Augier ²²⁰_{July 27, '96} showed to the Lille Medical Society a case of chorea of the paralytic variety which was preceded and accompanied by articular rheumatism and endocarditis. Notwithstanding its serious aspect the affection had a fortunate termination, the child, aged 10½ years, completely recovering in three weeks.

J. Sabrazès, of Bordeaux, ⁸¹_{Nov. 17, '94} performed an autopsy on a patient who had suffered from hemichorea limited to the right upper limb, the face and lower limb of the same side being unaffected. The lesions were found in the lenticular nucleus and encroached upon the internal capsule behind the genu. Destruction of a portion of the anterior fibres of the pyramid had occurred and descending degeneration could be easily traced as far as the medulla oblongata.

Litten, of Berlin, ⁸_{Dec. 19, '94} calls attention to chorea as a complication of gonorrhœa. He has observed one case of this kind—already noted by Frerichs—in a young man, aged 20 years, without nervous antecedents, and who suffered at the same time from swelling of the joints and from endocarditis.

Lannois, of Lyons, ¹⁴_{Nov. 31, '94} divides arhythmical chorea into three groups: (1) Sydenham's chorea, with its varieties (common, senile, paralytic, chorea of pregnancy); (2) chronic progressive chorea, of which two varieties are to be recognized,—namely, hereditary chorea and chronic progressive chorea without heredity; (3) symptomatic chorea, which may be divided into symptomatic hemichorea and hemiathetosis, symptomatic general chorea, congenital chorea, and bilateral athetosis.

Chronic Forms.—A. Chauffard, of Paris, ¹⁴_{Apr. 7, '96} showed a female patient suffering from chorea in whom the right side was the

more affected. Absence of any motor or sensitive hemiplegia, as well as the bilateral nature of the movements, clearly differentiated this hemichorea from that of cerebral origin and placed it under the category of chronic choreas. Though the mental condition customary in Huntington's chorea was absent, two special symptoms seemed to confirm the diagnosis,—namely, the chronic nature of the affection and its hereditary transmission.

Ganghofner, of Prague, ⁸¹⁹_{Sept. 14, '96} advances the theory that in the majority of cases of chronic chorea in children the symptoms differ but little from those of athetosis; he would consider the two pathological conditions as manifestations of an identical cerebral condition.

Drewry ¹⁰⁶³_{Sept. '96} gives an account of the case of a negress, aged 24 years, suffering from an affection which he entitles "chronic progressive chorea," which, he concludes, is the same as the one called Huntington's chorea. It is not necessarily hereditary, manifests itself in adults, and constitutes a distinct disease possessing its own clinical and pathological history. The mental troubles are progressive and may precede, accompany, or follow the motor troubles. It is often difficult to determine the cause. The disease is exceedingly uncommon and, in his opinion, is incurable.

Treatment.—Philip Coombs Knapp, of Boston, ⁹⁹_{Feb. 20, '96} treated eight cases of chorea by quinine in daily doses of from 6 to 8 grains (0.39 to 0.52 gramme). The children were removed from school, sponged daily with cold water, and a suitable mode of life, good food, limited exercise, and as much rest as possible enjoined. In one case complete recovery took place at the end of a week, in a second after two weeks, in a third at the end of ten weeks. In five cases no result was obtained, and arsenic was substituted for quinine. Putnam, in the discussion of Knapp's paper, stated that he had but little result from quinine, but that he had great faith in arsenical treatment. Many cases of chorea left to their own course recover.

Frank B. Fry, of St. Louis, ⁸²_{Nov. 24, '94} has treated many cases of chorea with quinine, both in private and in hospital practice, but the results have seemed to him unsatisfactory.

W. B. Atkinson, of Philadelphia, ¹⁹_{Dec. 8, '94} first seeks for and treats the cause, and then uses cimicifuga, adding chloral only when the movements persist.

Charles J. Symonds, ²_{Nov. 24, '94} used injections of arsenic in some cases, and thinks that the drug can be administered in much larger doses hypodermatically than by the mouth.

Mettenheimer ¹_{Oct. 20, '96} used exalgin in two cases of chorea, shortening the duration of the affection. As concomitant treatment he

employed substantial diet, iodide of iron, codliver-oil, and graduated gymnastics.

W. Morvin⁹⁹⁶_{Apr. 10, '96} discusses the drugs used in the treatment of chorea, with especial reference to the antispasmodics and hypnotics, —arsenic and antipyrin. Among the antispasmodics and hypnotics potassium bromide, chloral, extract of valerian, and zinc oxide have been especially praised. Arsenic is efficacious in large doses; the dose of 0.01 gramme ($\frac{1}{4}$ grain) of sodium arseniate must be quickly reached. Antipyrin may be given from the outset in doses of 2 to 3 grammes (31 to 46 grains) to a child 5 years old. As adjuvants, tonics, rest and country air, hydrotherapy, electricity, massage, and gymnastics are useful in favoring the action of the drugs. Treatment should vary according to the form and the intensity of the affection.

A. Charyeux, of Paris,¹⁰⁶_{Oct. 1, '96} insists especially on the value of hydrotherapy in three forms,—baths, douches, and the wet pack. The wet pack is the best method, used once a day. The sheet, dipped in water at 10° or 12° C. (46° or 53.6° F.), then lightly wrung out, is spread over a mattress covered with oil-cloth; it is then closely wrapped around the patient, who is rubbed from head to foot; without removing the sheet the body, with the exception of the head, is now wrapped in a woolen covering and the child is returned to bed.

A. D. Rockwell⁵⁹_{Aug. 2, '96} read before the American Medical Association a paper on the nature and treatment of chorea founded on personal observations. Central galvanization and general faradization are the two modes of treatment which have given him the most favorable results; employed either alternately, according to indications, or by themselves, they succeed not only in quieting the violence of the choreic movements, but even in shortening the course of the disease. The author finds that galvanic currents are preferable in vigorous and healthy children, while the faradic is better for weak and anæmic children of lowered vitality.

Charles W. Burr¹¹⁹_{Aug. 2, '96} states that the most important point in the treatment of chorea is rest of body and of mind. The child is to be left in bed or, if the affection is very light, he may be allowed to get up for a few hours only. The period of rest in bed varies according to the severity of the disease, but three weeks are usually necessary. The diet consists of milk, soup, and eggs. Tepid baths may be given with benefit. Arsenic is the best of all drugs.

Moncorvo¹¹⁸_{May, '96} described the case of a boy, aged 11 years, suffering from rickets and congenital syphilis, who, during a malarial attack, developed violent choreic manifestations. Moncorvo

had recourse to the daily use of asaprol, beginning with 1 gramme (15½ grains) and increasing to 5 grammes (1¼ drachms). The result was most satisfactory.

Tetany.

Etiology and Pathology.—Byrom Bramwell, of Edinburgh, is of the opinion, ²_{Jan. 1, '96} that tetany following total removal of the thyroid gland is a manifestation of acute myxœdema, and is due to the complete arrest of thyroid secretion. By the administration of thyroid extract this form of tetany, which, abandoned to itself, sometimes terminates fatally, may be arrested and cured. The author has been led to ask whether common or idiopathic tetany may not be due to lack of thyroid secretion, and whether it might not yield to administration of thyroid extract. He treated a child, 8 years old, by this method, and he requests other medical men to give it a trial. Gotstein ¹⁰⁰⁵_{Mar. '96} likewise notes the apparition of tetany following extirpation of the thyroid gland.

George J. Preston, of Baltimore, ¹_{Jan. 8, '96} observed a typical case of tetany in a girl aged 3½ years. The name of tetany, he believes, should be applied only to such typical cases. He advises as treatment a suitable hygiene, good diet, exercise, bromides, and electricity.

J. P. Crozer Griffith ⁵_{Feb. '96} has collected from American medical literature 72 cases of tetany, 9 of which are cases of his own. ²⁰²⁷_{'96} He is of the opinion that there is no difference between the tetany of adults and that of children. Soltan Fenwick ²_{Oct. 20, '96} read before the Clinical Society of London an account of two cases of tetany associated with chronic gastric dilatation. He ascribes the tetany to an organic poison produced in the stomach and, taken up through absorption by the circulatory system, producing a convulsing action upon the central nervous system. Rational treatment consists in washing out the stomach, either with tepid water or with a weak solution of resorcin. G. Kliatschkine ⁹²_{Nov. 10, '96} divides tetany into idiopathic and symptomatic, and looks upon it as a disturbance of the medullary reflex centres. He advises sedative drugs, galvanization of the peripheral nerves and spinal cord, and hydrotherapy.

Köster ⁶⁷³_{Jan. '96} reported a case of tetany occurring in a young man, 21 years of age, whose mother and sister were subject to cramps. For six months the patient had experienced painful contractions of the ocular muscles, the muscles of the arm, chest, and, above all, of the abdomen and legs. The contractions were more intense in cold weather. There was some trouble in swallowing, and retention of urine. The patient dying, there were discovered

at the autopsy hæmorrhagic effusions in the anterior part of the cauda equina and on a level with the roots of the third, fourth, and fifth pairs; there was also hyperæmia of the sciatic sheath.

Julius Neumann¹⁶²_{July 25, '96} has noticed that in pregnant women attacks of tetany are unknown before the fourth or fifth month,—at a period when the uterus begins to contract; they are especially frequent and serious during labor. Once delivery accomplished, they cease or lose their intensity. Some close relationship must, therefore, exist between tetany and uterine contractions.

Boudyrev⁵⁷¹_{Nov. 7, '96} has observed two cases of tetany,—one in a male infant of 1½ years, the other in a female infant of 11 months. For one or two days the convulsions were permanent.

Krafft-Ebing, of Vienna,²_{Oct. 17, '96} considers the diagnosis between tetany and tetanus. In the first place the previous history of the patient should be carefully noted; in tetanus there is found some lesion as a starting-place; trismus and stiffness of the neck are the first symptoms, which never occur in tetany, where the first symptoms occur in the hands and toes. Progressive tetany with intermissions may last for days, for weeks, or even for months, which is never the case in tetanus. Tetany runs its course without elevation of temperature, while tetanus is always accompanied by fever. Finally the three symptoms of Trousseau, of Erb, and of Chvostek are never met with in tetany. Emily Lewi, of New York,⁵¹_{Aug. '96} gives an account of four cases of tetany, one causing death. The four patients were male children of the respective ages of 9, 8, 8, and 1.3 months. All suffered from rickets. In each case the spasms were symmetrical and accompanied by pain.

Treatment.—R. K. Macalester⁵_{Oct. '96} has tried quinine in the treatment of tetany and has come to the conclusion that the benefit is but temporary and does not prevent recurrences. He obtained good results with phenacetin. If the nutrition can be improved by tonics and appropriate hygienic measures, a radical and lasting cure may be hoped for.

Writers' Cramp.

Etiology and Pathology.—Raymond, of Paris,²¹²_{June 10, '96} distinguishes two principal varieties of writers' cramp,—a spasmodic and a paretic form. Predisposition plays an important part in the etiology of the affection; indeed, writers' cramp is often inherited. Treatment of the general state of health and local treatment by massage and studied movements are, therefore, indicated. The patients are sometimes influenced by suggestion.

J. W. Putnam, of Buffalo,⁵⁹_{July 12, '96} reported a case of writers' cramp in a telegraph operator. The cramp extended to the mus-

cles of the arm, to the trapezius, and to the sterno-mastoid. On endeavoring to write the patient's head would be drawn to one side so that he could no longer see the paper. Treatment consisted in hypnotism and in injections of atropine deep into the muscle. Complete recovery took place in two months. In the discussion Riggs stated that he had treated an almost similar case by hyoscyamine hydrobromate. Smith Baker believed the associated contractions to be the result of a customary attitude. Writers' cramp may be of purely psychical origin, in which case rest, hypnotism, or any sufficient psychical impression will bring about a cure.

A. Pick, of Vienna, ²⁴³_{Sept. '96} has observed among patients suffering from writers' cramp nodules disseminated along the extensor muscles of the forearm, sometimes isolated, sometimes in series, and especially occupying the tendons of the first three fingers. The author looks upon these formations as secondary and due to the neurosis.

Treatment.—S. H. Monell, of Brooklyn, ¹_{June 1, '96} has successfully treated by static electricity a case of writers' cramp in a woman, 25 years of age, for five years a telegraph operator. She was cured in fifteen sittings, during which she continued her ordinary vocation except for the last three days when she was occupied in other work. The sittings were fifteen minutes in length at first, and later on twenty minutes.

Tic Convulsif.

Landon Carter Gray ⁵_{May, '96} considering the denomination of tic convulsif to be improper and noting the analogy of that affection with chorea, proposes that it should be known as "palmus." He divides palmus into: (1) facial, (2) general, (3) acute, and (4) general with pseudomelancholia.

The most common type is facial palmus. It consists in jerking movements, instantaneous and of lightning rapidity, causing sudden contractions of the cheeks or movements of the brow, repeating themselves twice or thrice. Sometimes the head is carried forward and the shoulder is raised. In the majority of cases the convulsions are bilateral. Gray believes this affection to be more frequent than is generally supposed, and thinks that many cases treated as chorea are really cases of facial palmus.

General palmus answers to the description given by Gilles de la Tourette of tic convulsif; sudden, intermittent, jerking movements of various muscles of the body. However, the author has not observed coprolalia or inco-ordination of movement. He has seen but a single case of acute palmus,—in a child aged 6 years.

When standing by a table his chin would be suddenly drawn down, striking the piece of furniture with violence, or else his head would be carried violently to one side, the danger of striking surrounding objects being great; sometimes his legs would be violently contracted and he would be thrown to the ground. A cure was obtained in six weeks by rest in bed and Fowler's solution.

In general palmus with pseudomelancholia the patient is sad and suspicious; two cases have been observed by the author.

As to treatment, the author recommends Fowler's solution and galvanism, and absolute rest in bed for a week or two. The patient may then be allowed to get up for two or three hours, and so on, progressively; so that toward the end of the third or fourth week he may remain up the whole afternoon; for a period of eight or ten weeks, however, he must stay in bed during the whole morning and go to bed early. Long walks and fatiguing occupations are to be avoided for several months. Good diet and tonics are necessary.

Tremor.

Etiology and Pathology.—Raynaud ¹²⁶_{Jan. 16, '96} studied the connection between senile and hereditary tremor, and thinks that, from a clinical stand-point there is no distinction between the two, while from an etiological stand-point identical causes can give rise to either. The author proposes to unite the two morbid conditions into a single nosological type,—“neurosis tremulans.” George F. Jelly ¹⁹_{Jan. 19, '96} reports the case of a man who was on the point of being run over, having fallen upon a railway-track. Consequent upon the mental shock there occurred tremor of the lips, tongue, and hands, and, when standing, of the legs. Any sound, especially when caused by a train in motion, increased the morbid phenomena. E. Arnould, of Lille, ³⁸⁰_{Oct., '94} believes that tremor is due to intermittent or sudden variations in the intensity of muscular tonus.

Baumel, of Montpellier, ¹⁴_{Sept. 15, '96} noted, in a child of 13 years, tremor limited to the upper extremities, increased by erect position, as in the morning on rising. The tremor dated back four years and had supervened after a fall, with fracture of the condyle of the humerus. Examination of the antecedent history and of sensory phenomena led to a diagnosis of traumatic hysteria.

Le Filliâtre, of Paris, ⁹⁴_{Sept., '94} ⁴⁵¹_{Feb., '96} has invented an apparatus for recording tremor. It is composed of two of Marey's drums, one serving as a registering drum, the other employed to transmit to the first, by means of an India-rubber tube, the vibrations communicated to an elastic membrane by a horse-hair, which is attached to the tongue or to the skin of any part of the body by

means of a hook of special form ; this hair passes over the groove of a pulley.

Andrea Cristiani, of Luca, ⁵⁰¹_{Nov. 1, '94}, ⁴⁵¹_{Feb. '95} has taken tracings of twenty-two cases of tremor in lunatics, finding that, according to the state of excitement or of depression of the patient, the tremor shows certain special characteristics.

Treatment.—Bruger, of Paris, ⁹⁰⁶_{Mar. 10, '95} tried hyoscyamine, recommended by Oulmont against mercurial tremor, and considers it wise never to go beyond 0.004 gramme ($\frac{1}{16}$ grain) in medium cases and 0.01 gramme ($\frac{1}{8}$ grain) in serious cases. The drug is to be administered between meals, and a milk diet and sulphur-baths are to be employed concurrently.

Athetosis.

Symptomatology.—R. M. Phelps, of Rochester, ⁴⁵¹_{Feb. '95} reports the case of a woman, aged 25 years, in whom, at every attempt at motion, the hand is flexed upon the wrist and the fingers upon the hand. The same phenomenon is shown by the legs and feet. Motions are slowly executed ; the facial muscles and those of the thorax stretch and contract slowly. Rauzier and Cazalis, of Montpellier, ¹⁴_{Nov. 22, '94} saw a child, 9 years old, who, after a sudden fright, suffered from typical athetotic movements, with stiffness and paresis at intervals in the left upper and lower extremities. The sensory system was normal, the intelligence quick and precocious.

A. O. J. Kelly, of Philadelphia, ¹⁰_{June 1, '95} reports the case of a young man, aged 18 years, who, from the first to the thirteenth year of his life, suffered from convulsive attacks, beginning with a sensation of emptiness in the head, followed by nictitation of left eye, by contraction of the same side of the face, and by an inclination of the head to the right. Loss of consciousness then ensued, and convulsive movements of the entire left side. When the patient consulted Kelly his hand was animated by slow and involuntary movements, abduction and adduction, hyperextension and flexion of fingers, pronation and supination of hand and forearm. Treatment by potassium iodide and electricity brought about a good recovery.

Brandeis, of Bayonne, ¹⁴_{Sept. 1, '95} cites a case of double athetosis in a woman, 32 years old, whose father was epileptic and who had syphilis at 19 years. At 23 miscarriage was followed by muscular contractions of the face, nystagmus with slow oscillations, backward and forward and sidewise movements of tongue ; contracture of fingers, hands, and wrists ; rotatory movements of the neck ; flexion and extension of the feet.

H. Oppenheim ⁴_{Aug. 25, '95} saw a woman aged 31 and her child aged

10, both suffering from athetosis, the symptoms being exactly alike in mother and child.

Treatment.—William F. Drewry⁸¹_{May, '96} reports two cases, the first in a woman, 36 years old, with athetosis of the superior and inferior extremities associated with epilepsy and mental disturbance. The second case was that of a young female idiot, 15 years old, suffering from bilateral athetosis. The author recalls Horsley's opinion, that excision of the diseased cortical centres is to be advocated, and states that this treatment seems to him to be rather heroic in a case of double athetosis.

Miscellaneous Spasmodic Disorders.

Lensschon¹⁸⁹_{July, '96} gives an account of a girl, 14 months old, suffering from rickets, who for three months presented certain curious phenomena. When held by her mother, the legs being allowed to hang down, a cracking noise was to be constantly heard, and at each sound the tibia was suddenly borne outward, the external condyle showing under the integument. Another child, 13 months old, exhibited similar phenomena, but at the head of the femur. The author thinks the cases due to reflex spasm. Charles Féré, of Paris,³_{Jan. 21, '96} cites a case of spasm limited to the little finger, appearing about three months previously in a little girl. No nervous heredity could be discovered. The spasm was at first noticed only at rather prolonged intervals, but later on it became permanent. The author attributes it to the predominating action of the last interosseus palmaris and of the flexor minimi digiti.

F. Shultze²⁴²_{Feb., '96} attended a farmer, without hereditary disposition and of ordinarily good health, with the exception of attacks of headache. After excessive bodily fatigue he experienced painful spasms in the lower limbs, trembling, and a sensation of fatigue compelled him to cease all work. Passive movements were accompanied by tonic contractions of the calf-muscles and of the adductors of the thigh, with similar but less marked phenomena in the other muscles of the body. Recovery followed rest and prolonged warm baths.

W. S. Lindsay, of Topeka,⁸⁰¹_{Oct. 20, '94} gives the history of a woman of 25 years, who while suffering from toothache, experienced strange abdominal contractions. These contractions persisted after the tooth was removed. On examination slight distension of the abdominal parietes was noted, with neither pain nor sensitiveness. Spasmodic contraction of the rectus muscle was to be perceived, each contraction being accompanied by a rapid expiration. The author thinks that the case is one of reflex spasm due to irritation of the dental nerve.

Jeanselme, of Paris, ¹⁴_{June 19, '96} describes the case of a man of 24 years, who, on the eighth day of an attack of gonorrhœa, experienced pains in the right hip, then in the knee and the tibio-tarsal articulation on the same side. Three weeks later excrescences appeared on the feet, the toes having genuine horns, the bottoms of the feet being covered with a horny sole and the extremities of the toes being ensheathed with horn, causing the nail to fall out. Jeanselme thinks that the gonococcus and its toxins affected the spinal cord and caused trophic disturbances.

According to S. Goldflam, ¹¹⁵⁸_{Feb. 22, '96} the anatomical characteristic of the affection known as Charcot's intermittent claudication is a morbid alteration of the vascular walls of syphilitic origin.

Charles Féré ⁹²_{Sept. 10, '94} describes a form of cervical functional spasm showing itself after a chill, rheumatoid pain, local irritation, emotion, or some general affection. Usually it is unilateral. The head is suddenly moved either in the direction of the action of the trapezius muscle or in that of the sterno-mastoid. The shocks vary considerably in rapidity; they may take place every second or even more often. The extent of the movements is quite as variable. They are sometimes hardly perceptible oscillations, sometimes the rotation of the head is carried to its extreme limit; the chin is projected toward the shoulder, sometimes being borne upward, sometimes carried downward until it touches the clavicle. The differences in direction of the spasmodic movements are due to the fact that the muscles of the anterior and those of the posterior region may be affected separately or with a marked predominance of one over the other. At times the sterno-mastoid and the trapezius seem to be the only ones affected, but in reality this is not often the case. All the cervical muscles may be affected; often the disturbance goes beyond the region of the spinal nerve and affects the muscles innervated by the facial nerve, by the motor branch of the trigeminal, and by the nerves of the cervical plexus. Some subjects can stop the spasm at will by pressing on certain points or by assuming certain attitudes. Frequently there seems to be an increase in the volume of the muscle which takes the principal part in the spasmodic movement, while, on the contrary, there is alteration of the antagonistic muscles. Féré has observed atrophy of the sterno-mastoid of the healthy side; this atrophy is, perhaps, not consequent upon the spasm of the muscle of the opposite side, but the spasm may be the consequence of the atrophy.

Pick ²⁴⁸_{Sept. '96} calls attention to a case of cramp of the adductor muscles of the thigh occurring in a horseman whenever he placed himself in the saddle.

Paramyoclonus Multiplex.—Raymond, of Paris, ⁷⁸_{Jan. 29, '98} does not look upon Friedreich's paramyoclonus multiplex as a morbid entity, but simply as a special form of myoclonus which is a symptomatic manifestation of a lowered state of the nervous system found only in subjects with an hereditary taint and predisposed to the most varied affections of the nervous system. As to its pathogenesis, Raymond, rejecting the sympathetic, neuritic, and spinal theories, inclines toward the theory which assigns to myoclonus a cortical or subcortical origin. As to treatment, he thinks that therapeutic measures, when efficacious, act, above all, through suggestion.

Convulsions in Children.—Montenuis, of Dunkerke, ⁸⁵_{July 18, '98} recommends small, medicated enemata and wet cloths about the lower limbs in the treatment of convulsions in children. To prepare the wet cloths, two handkerchiefs or two towels, according to the child's age, are folded twice and dipped into the solution employed (cold water to which has been added a small amount of vinegar, cologne-water, or some other alcoholic toilet preparation), wrung out so that the liquid will not flow from them, then applied so as to make a sort of boot on each leg. The foot and leg are wrapped up from the toes to above the knee in such a way that the cloth goes one and a half times around the limb. Wool is then placed around it.

Paralysis.

Etiology and Pathology.—Edward C. Runge, of St. Louis, ²⁴²_{Apr. '98} describes a case of professional paralysis of the supinator and extensor muscles in a waiter who was in the habit of carrying piles of plates upon the arm. One day the arm suddenly assumed a prone position, the palm downward, the wrist hanging. The treatment consisted in the application of the galvanic current.

F. Raymond, of Paris, ¹⁷_{Mar. 23, '98} has observed a case of double paralysis of the deltoid muscle in a man, aged 24 years, who was in the habit of sleeping on his back with the arms raised and hands clasped behind the head. The author attributes the paralysis to compression and distension of the circumflex nerve.

Bézy, of Toulouse, ²⁴_{Aug. 14, '98} observed a double brachial paralysis of hereditary syphilitic origin in a child of 2 months.

Loviot, of Paris, ¹⁴_{Apr. 10, '98} communicated to the Société Obstétricale et Gynécologique a case of obstetrical paralysis affecting only the flexor muscles of the arm. The child had presented by the breech, and fracture of the posterior arm had occurred in delivery. The muscles supplied by the musculo-cutaneous nerve were affected, and Loviot asked whether the paralysis had not been

caused by the callus compressing the nerve. Budin thought that it was due to compression of the nerve between the fragment of bone and the plaster dressing, and doubted whether the case was one of obstetrical paralysis.

J. P. Crozer Griffith,⁴⁵¹ looks upon the various forms of paralysis occurring in children as under the influence of the two segments of the nervous system (primary muscular paralysis remains outside of their control). Spasmodic symptoms with absence of atrophy are indicative of a lesion of the superior segment. Atrophy with loss of knee-jerk and other spasmodic symptoms depend upon lesion of the inferior segment. If faradic contractility is normal, without reaction of degeneration, there is lesion of the superior segment; loss of faradic contractility, with reaction of degeneration, indicates lesion of inferior segment; loss or diminution of faradic contractility, with loss of knee-jerk, with absence of reaction of degeneration, and of spasmodic symptoms, indicates, on the other hand, disease of the muscle.

F. Benoit,⁹² Aug. 10, '96 discusses the disturbances of the trigeminal nerve occurring during attacks of oculo-motor paralysis. He thinks that oculo-motor paralysis and disease of the trigeminus are frequently to be found in the same subject. Ocular paralysis may be complete, all the muscles being affected, one or more nerves being affected throughout all their branches, or *dissociated*, ophthalmoplegia being either external or internal or affecting a portion of the oculo-motor nerve. These associations usually indicate some local lesions of the regions through which the trigeminus and oculo-motor pass, or else some affection of the central or peripheral nervous system; in some cases the nervous trouble would seem to be symptomatic. Three typical forms can be distinguished, varying as to localization: (1) a basilar type, in which the causal lesion is situated at base of cranium; (2) a diffuse nuclear type, with lesions of the nuclei and tracts of medulla oblongata, but without systematic distribution; (3) a motor type, in which the causal lesion is a systematized affection of the motor gray axis of the cord and cerebrum, characterized by the absence of any alterations of the sensory system.

Thirolloix, of Paris,⁴³³ divides brachial monoplegias, according to their origin, into cerebral, pyramidal, medullary, radicular, neuritic, and muscular.

Symptomatology.—Tison,²⁴ Jan. 1, '96 publishes three cases of superior radicular paralysis of the brachial plexus; associated paralysis of the deltoid, biceps, coraco-brachialis, brachialis anticus, and supinator longus existed, the triceps and muscles of forearm (excepting the supinator) not being involved. Ordinarily the supra- and

infra-spinati are likewise affected. More or less rapid atrophy of paralyzed muscles occurs; faradic excitability first diminishes, then disappears, while galvanic excitability is lost only in extreme cases, and usually is only diminished. No disturbances of sensation are present.

Raymond, of Paris,¹¹⁵⁸_{July 27, '96} showed at a clinical lecture a woman who, toward the middle of October, 1894, experienced one morning on rising, and without any apparent cause, a sharp pain in the cervico-dorsal region of the spine. She could neither move the head and neck nor comb her hair. These painful phenomena disappeared two weeks later. The 6th of November, in the evening, she noticed a red and painless spot, situated in the interdigital space between the fore- and middle fingers. The next day a rose-colored streak extended upward from the spot along the forearm as far as the elbow; six days later it vanished. Almost at once afterward swelling appeared, limited to the index and middle finger, and articular pains in all the joints of the corresponding upper limb. Next day the œdematous swelling had extended to the whole hand, especially the dorsum, and the pains had increased. Monoparesis was present, with anæsthesia of hand, forearm, arm, and shoulder; the internal aspect of the arm, from the axilla to the wrist, retained its normal sensibility. There was no reaction of degeneration. Gradually the articular pain disappeared, motility returned, but anæsthesia still persisted. Raymond made the diagnosis of radicular sensitive paralysis.

Luigi Ferrio⁵⁸⁰_{Aug. 2, '96} observed, in a woman of 27, hemiatrophy of the tongue with paralysis of the spinal accessory of the same side. The author is of opinion that the lesion may be localized in the medulla oblongata, at the spot where the nuclei of eleventh and twelfth pairs are found.

Pandi³¹⁹_{Apr. 27, '96} cites the case of a joiner, aged 35, who, whenever he was exposed to cold, suffered from abundant perspiration of the left side of the face, with convulsive movements of the arm on the same side. Facial paralysis of central origin was present.

Adolph Schmidt, of Bonn,⁷⁵_{Sept. 1, '96} observed, in a man aged 52, isolated complete paralysis of the trigeminus, which began seventeen years previously. The left temporal and masseter muscles had become wasted and the sense of smell on the same side had disappeared. The pupil and muscles of the eye were normal; the left side of the face was anæsthetic as regards temperature and faradic excitation.

Francotte, of Liège,⁶⁸⁵_{June, '96} gives an account of a patient suffering from alcoholic pseudoprogressive general paralysis with incomplete symptoms. What more especially characterizes this affection is

that the symptoms attain their maximum at once, one may say, while in true general paralysis the course is essentially progressive. A confirmed and sufficiently prolonged recovery permits the exclusion of general paralysis.

W. S. Colman⁹⁸_{July, '96} has observed a case of pseudohypertrophic muscular paralysis with preservation of patellar reflex.

C. S. Caverly, of Rutland,⁵⁰_{Dec. 1, '94} describes an epidemic of an unaccustomed form of acute nervous disease, of which he witnessed one hundred and twenty-six cases, attacking especially children under six years old. The affection was characterized by paralytic phenomena, with rigidity of the muscles of the spine and with strabismus.

According to Raoul Brunon, of Rouen,¹¹⁵³_{June 30, '96} the painful paralysis of young children presents the following characteristics: One of the upper limbs is found to be in a state of flaccid paralysis; it hangs inert, and, if raised, or if an attempt be made to flex the forearm upon the arm, it falls back heavily and remains hanging beside the body. No anæsthesia exists; if the skin be pinched the child begins to cry, being sometimes unable to move the arm or sometimes to move it slightly in order to avoid the pain. The slightest movement or exploration is painful. The onset of the affection is sudden and recovery occurs spontaneously within several days. Brunon thinks that some other cause than a local traumatism is to be thought of, and is disposed to believe in the intervention of (1) an inhibitory action explanatory of the paralysis; (2) an intellectual act, which is the recollection of the initial pain and which explains the cries of the patients at the slightest movement.

Treatment. — Sighicelli¹⁴_{Sept. 15, '96} thinks that artificial ischæmia changes a limb into a more uniform medium and the muscles into more homogeneous and smaller cords through which an electric current passes with greater strength and less loss of energy. In paralysis of amyotrophic and peripheral origin, therefore, he is in the habit of electrifying limbs previously rendered bloodless by means of an Esmarch bandage. The congestion following removal of the bandage acts favorably upon the nutrition of the muscle, while the local anæsthesia which accompanies the ischæmia allows the use of stronger currents in children.

Doumer,⁹⁹⁶_{Sept. 25, '96} in treating funicular paralysis of the facial nerve, prefers galvanization to faradization, the former having the advantage of acting more directly upon the nutrition of the nerve and muscles. A large positive pole is applied to the nape of the neck and a small negative pole, well dampened, two centimetres in front of the ear, on the course of the facial nerve; the current

should be of from 5 to 8 milliampères and the application last a couple of minutes. Then the negative pole is moved for six to eight minutes over the paralyzed muscles. Three or four such applications are made in a week, and, if necessary, hypodermatic injections of strychnine (strychnine sulphate, 0.05 gramme— $\frac{7}{8}$ grain; distilled water, 10 grammes— $2\frac{1}{2}$ fluidrachms) employed, from 5 to 10 drops being injected into the skin of the face or behind the ear every two days. Later on, when voluntary movements begin, the injections are stopped, and, after each galvanization, the faradic current applied to the principal facial muscles.

Lead Paralysis.—Maurice Soupault and F. Raymond³¹_{Feb. 14, '96} call attention to various hysterical manifestations provoked by lead poisoning. Among these manifestations, the paralytic form is especially interesting, and presents the usual aspect of hysterical paralysis, without any characteristics revealing its cause. In some patients, however, paralytic accidents are noted which, by their onset, as well as by the other symptoms and stigmata which accompany them, would seem to indicate hysteria, and which, on the other hand, by their localizations and special characters, belong to lead poisoning.

Newmark⁹_{May 11, '96} gives an account of a little girl of 7, who suffered from paralysis due to lead poisoning after sleeping in a freshly-painted bed.

E. R. Axtell, of Denver,¹_{July 27, '96} gives an account of a man, aged 33, who was exposed to the triple effects of alcohol, tobacco, and lead. For three weeks he complained of sharp and continuous pains in the lumbar region and of a feeling of numbness and tingling in the legs and arms. He then became paralyzed in the lower extremities.

Wharton Sinkler⁵¹_{Aug. '96} cites three cases of lead paralysis occurring in a little girl of $10\frac{1}{2}$ and her two brothers aged, respectively, 3 and 6. No blue line on the gums nor lead cachexia was noted, the symptoms being those of poliomyelitis.

W. Janowski⁶⁸_{Aug. Sept. '96} observed two attacks of lead poisoning at three years' interval. In the first attack paralysis of the left arm occurred, disappearing in four months. In the second attack there was no paralysis of limbs, but fine, irregular pulse, contraction of right pupil, and slight paralysis of right facial nerve.

Tarkowski²⁴²_{Aug. '96} describes a case of facial paralysis due to lead poisoning. The pupil on the affected side was diminished in size and reacted feebly to light. The pulse, full and strong on entry into hospital, became thread-like and irregular twenty-four hours later. As no cardiac lesion existed, Tarkowski attributes this phenomenon to the lead poisoning.

Facial Paralysis.

Bézy, of Toulouse, ¹¹⁵³_{Apr. 30, '96} in a study on facial paralysis in the child, calls attention to the fact that, the aspect of the face being much less characteristic than in adults, the affection may pass unnoticed, especially if the paralysis is bilateral or slight. It is likewise difficult, in very young children, to appreciate troubles of olfaction and of taste. The author concludes that facial paralysis, non-obstetrical in origin, merits more consideration than has been so far given to it in works on children's diseases.

Pierre Marie, of Paris, ²¹²_{Aug. 10, '96} showed, in the course of a clinical lecture, two patients suffering from peripheral facial paralysis. The first one had had hæmoptysis, then a discharge from the ear followed by facial paralysis. All the symptoms of paralysis of peripheral origin were present, and in addition a phenomenon very rarely noted,—viz., that, although he could not voluntarily lower the upper eyelid, yet, when watching an object which was lowered before him, the eyelid could be seen to follow the motion of the eye and to be drawn down with it. Marie likewise called attention to a symptom which is rarely sought for, though easy to discover: if cold water be thrown upon the paralyzed parts the reflex will be absent in paralysis of peripheral origin, whereas it will persist in paralysis of central origin. In the second patient the only detail worth noting was that the paralysis developed during the course of a recent syphilis.

Rudolf Hatschek, ²⁴²_{Feb., '96} having noted the frequency of recurrences in facial paralysis of peripheral origin, attributes them to a constitutional tendency rather than to local predisposition secondary to an anterior attack. As causes, he mentions diabetes, syphilis, and infectious diseases (diphtheria, influenza, epidemic parotitis, etc.).

H. F. Müller ⁷⁵_{Sept. 1, '94} notes two cases of facial paralysis dating from infancy and persisting in adult life.

W. J. Darkas ²⁶⁷_{Dec. 15, '94} has observed a case of double facial paralysis following influenza, with recovery in six weeks.

Oppenheim ⁶⁸_{Aug., Sept., '96} cites three cases of facial paralysis. The first case was of peripheral origin, with hysteria, in a woman 32 years old. A fall which frightened the patient was followed by pains in the head and paralysis with loss of speech for three days. Three weeks after the accident generalized convulsions occurred and the paralysis became complete. Left hemianæsthesia with sensory troubles was present. The second case was one of facial paralysis with hemiplegia of the same side, in a patient who had suffered from violent headaches with mental disturbances since 1881; in 1892 right hemiplegia and aphasia developed, in 1893

contractions of paralyzed muscles, and in 1894 right deafness and lagophthalmos. The third patient, aged 58 years, suffered from glosso-labio-maxillary hemispasm and tabes dorsalis. Loss of teeth and first symptoms appeared at 30 years of age, and for some years past there had been almost complete ophthalmoplegia. Analgesia of the two trigeminal nerves and numbness of the left little finger were present, with paralysis and spasm of muscles on the left side of the face following an emotion; the mouth was drawn to the right, the sleep was troubled by nightmares, and there was distress of mind. The spasm recovered under the use of faradization, but the other symptoms persisted.

P. Hübschmann, of Leipzig, ³¹⁹_{Apr. 27, '96} has observed 6 recurrences among 99 cases of rheumatic facial paralysis. If the infectious origin of the affection be admitted, recurrence is possible whenever immunity has not been produced by the first attack. Julius Donath ¹³_{Mar. 16, '96} publishes a study of relapsing facial paralysis. Hutchinson ²²_{Aug. 21, '96} noted, in a woman aged 25, a symmetrical case of facial paralysis and paralysis of the auditory nerves. Ludwig Mann, of Breslau, ⁴_{Dec. 3, '94} publishes an article on the symptomatology of peripheral facial paralysis.

Infantile Paralysis.

A. Primrose, of Toronto, ³⁹_{Feb. 1, '96} has studied the peripheral lesions of infantile paralysis by dissection of a leg amputated at the knee in the case of a boy of 13 years. He noted marked atrophy of muscles, of vascular system, and of nerves, and increase in subcutaneous adipose tissue; on the other hand, adipose tissue in the muscles was rare. The author thinks that, if the trophic nerves of the skin are supposed to pass by the posterior roots, it may reasonably be supposed that in anterior poliomyelitis the skin and the subcutaneous cellular tissue remain intact and are not involved in the atrophy which affects the muscle.

Buccelli ¹⁴_{Aug. 28, '96} cites a case of recurrent infantile paralysis in a child of 20 months. The second attack, less intense than the first one, was characterized by sudden onset, with fever, symptoms of cortical irritation, and paralysis of both arms.

Drobnik, ¹⁴_{Aug. 28, '96} with the idea of overcoming certain deviations and malformations in infantile paralysis, decided to substitute the action of healthy muscles for that of the muscles affected. He sutures the tendon of a paralyzed muscle to the central end of a neighboring healthy muscle. If advisable to suppress entirely the action of the latter its tendon is cut below the suture; otherwise it is split into two parts, one being left as it is and the other united to the tendon of the paralyzed muscle.

Galliard¹⁴_{Mar. 10, '96} showed before the Société médicale des Hôpitaux of Paris a female patient of 31 years who had entered the hospital to be treated for tuberculosis of the left apex. On examination, paralysis of the serratus magnus muscle was observed, which, according to her account, had begun at the age of 6 or 7 years. Atrophy of the inferior fibres of the trapezius and the pectoralis major muscle was also noted. Galliard expressed the opinion that the case was one of infantile paralysis unusual in localization. Pierre Marie did not agree with this, as no atrophy of the bones was present. He was inclined to look upon the case as one of radicular paralysis.

Miscellaneous Paralyses.

Diphtheritic Paralysis.—Preiz⁸¹⁹_{Apr. 27, '96} has studied the pathological anatomy of diphtheritic paralysis, which he believes to be a degenerative process of the peripheral nerves.

E. W. Goodall⁴⁷_{Summer and Autumn, '96} observed, in the Eastern Hospital, Honurton, during the years 1892 and 1893, 1071 cases of diphtheria. There were 125 cases of paralysis, 55 being males and 70 females. Usually the pseudomembranes, or exudation, had completely disappeared before the appearance of paralytic symptoms. In the majority of cases the soft palate only was first affected; in 28 cases paralysis remained limited to it; in 17 cases the ciliary muscles only were paralyzed; in 11 cases the soft palate and the ciliary muscles were affected; in 6 the soft palate and the lower limbs; in 3 the soft palate and the muscles of the eye; in 1 the respiratory muscles. In 16 cases the paralysis became quite generalized. Of 17 cases of death 13 may be said to have been certainly due to paralysis.

Landry's Disease.—Oettinger and Marinesco, of Paris,³_{Jan. 2, '96} attributes acute ascending paralysis, or Landry's disease, to the localization in the nervous system of a micro-organism or of its soluble products. The disease might be named according to the micro-organism which is the cause (ascending typhoid, variolic, or rubeolic paralysis). Sometimes the starting-place of the infection is not to be found. Three principal types are described by the authorities who have written on the subject: the spinal, the neuritic, and the mixed form.

Little's Paralysis.—Marfan, of Paris,¹⁵²_{Sept. 12, '96} calls attention to a case of Little's paralysis in a little girl of 6. The knees touch, the heels are drawn apart, and there is equino-varus. The thighs are flexed upon the pelvis and the legs upon the thighs; the tendon-reflexes are increased, the lower limbs are impotent and animated with movements of a special kind. There is no spas-

modic stiffness in the upper limbs, but a certain degree of loss of power. Intelligence is normal.

R. Barclay Ness ²¹³_{Aug., '94} observed a case of Little's paralysis in a child of 9 months. The arms were rather stiff, the fingers flexed into the palm of the hand, and the thumb was turned over. The child could hold any object handed to him, but could not carry it to his mouth. The legs were somewhat less stiff than the arms and the knee-jerk was increased. Any sudden and violent sound produced spasmodic movements of the head and limbs. The mother was a primipara of 36 years; labor lasted over twelve hours and was ended by forceps. After birth the child did not breathe for over half an hour and did not cry for three hours. The next day it remained motionless and was fed with a spoon. On the third day it had a few spasmodic movements of the head, its eyes rolled, some stiffness was noticeable in the arms, and from this time the above-mentioned phenomena were observed.

Muscular Atrophy.

André Moussous ¹⁸⁸_{Dec. 12, '94} describes the case of a child of 12, without hereditary antecedents, suffering from primary progressive amyotrophy. The face, tongue, and hands were spared. Symmetrical wasting of shoulders, arms, and forearms was marked. The lower limbs were slender. The feet, especially the left foot, were in an equino-varus position. The tendo Achillis was felt to be stretched under the integuments and the leg was slightly flexed upon the thigh. The child could walk with difficulty, was easily fatigued, and could neither jump nor walk upstairs. The muscles of the dorso-lumbar region were weakened. No fibrillary contractions were present and the knee-jerk was absent on the left side and hardly perceptible on the right side. No disturbance of the cerebral nervous system or of the sensory organs existed, nor were the sphincters affected. Intellect was normal. Electrical examination showed preservation of faradic excitability in the muscles and absence of the reaction of degeneration.

Bouchaus, of Lille, ²²⁰_{Nov. 4, '94} admits, with modern authors, the existence of two varieties of muscular atrophy: spinal progressive muscular atrophy (Aran-Duchenne variety) and myopathic progressive muscular atrophy. The latter comprises the following chief forms: (1) pseudohypertrophic paralysis, (2) Læder-Mæbius form, (3) Erb's form, and (4) Landouzy-Dejerine form. Whatever the form may be, the myopathy is hereditary and found in several members of the same family, and almost always appears in youth. It shows itself as muscular atrophy or pseudohypertrophic atrophy, insidious in its onset and developing slowly. Neither

fibrillation nor reaction of degeneration is to be found. The muscles innervated from the medulla oblongata are never attacked by the atrophy; the spinal cord and peripheral nerves are normal, while the muscular fibres are altered and the interstitial cellular tissue undergoes sclerosis, or fatty infiltration.

X. Debedet ¹⁰⁶¹_{Nov. 15, '94} observed a case of traumatic atrophy affecting the serratus magnus alone. The patient was one day performing with a dumb-bell weighing about 10 kilogrammes (22 pounds) when, on raising the right arm vertically, he experienced a sudden and violent pain in the region of the scapula. He noted that during the movement the inferior angle of the bone had struck against the spine. He could no longer raise the arm as before, without the help of his left hand; otherwise it would fall in such a way as to form an angle of 45 degrees, opening upward, with the spine. During the night he experienced much pain and the next morning he was struck by the deformity of the right scapular region, for when the arm was placed so as to extend horizontally forward the scapula formed an abnormal protuberance behind. Debedet saw the patient for the first time one month after the accident, when inspection of the dorsal region revealed the fact that the lower angle of the scapula was more prominent on the right side than on the left; a slight furrow was to be noted leaving the angle and running toward the lower edge of the last rib. On palpation the inner border of both scapulæ could be felt to be equally distant from the line formed by the spinous processes of the spine. All the movements of the right upper extremity were possible and normal both as to amplitude and energy, with the exception of complete vertical raising of the arm; in that case the arm stopped as soon as it had passed some distance beyond the horizontal line. If the patient went through the motion of pushing forward with the shoulder, the arm being held horizontally, the scapula was at once moved outward and formed an enormous protuberance; at the same time the lower angle was greatly raised and the external angle was moved downward to a like degree. No pain was felt in any of these movements. Application of the faradic current for five minutes daily was given as treatment and in three months recovery was complete.

J. Torrance Rugh and Charles K. Mills ²⁴²_{June, '96} treated a female patient for progressive muscular atrophy, most marked in the rhomboidei and shoulder muscles, but also affecting the muscles of the tongue and face and the external muscles of the eyeball. The authors remark that it is not common to see muscular atrophy begin in the muscles of the shoulder and rhomboidei, and remain more marked there than elsewhere.

J. B. Charcot, of Paris, ²¹²_{July 25, '96} concludes that, notwithstanding the dissociation of the various forms of muscular atrophy, Duchenne's disease retains such clearly characterized traits, both anatomically and clinically, that it is impossible not to admit its existence as a morbid entity.

J. H. Lloyd, of Philadelphia, ¹¹²_{Mar., '96} observed a case of muscular atrophy following severe enteric fever. During the sixth week painful contractures of the knees and pains in the legs were noted. Toward the end of the third month the right knee began to swell and the leg of the same side became œdematous. The swelling persisted, but neither redness, heat, nor pain, except during movements, could be discovered. Lloyd saw the patient in the fourth month, when both knees were contracted and any attempt to extend them caused great pain. The right knee was still swollen and the leg œdematous. The peronei muscles and the sural triiceps were much wasted, especially on the left side, and the extensor longus digitorum was not quite paralyzed. The knee-jerk was absent on the right side and diminished on the left side. The hands and arms were not affected like the lower limb, though there was some wasting of the thenar and hypothenar eminences. No fibrillation nor scoliosis was noted.

Harold N. Moyer ⁶¹_{Oct. 27, '94} observed a case of neuritis simulating progressive muscular atrophy in a woman of 21, with nystagmus and increase of patellar reflexes.

William C. Krauss, of Buffalo, ⁵⁹_{July 13, '96} performed the autopsy of a man, aged 78, who for more than sixty years had suffered from atrophy of the peronei muscles and who died of uræmia. Examination of the spinal cord showed alterations of the antero-lateral group of multipolar cells, especially on the left side; the middle group was less affected. There was some sclerosis of the white substance.

Dejerine, of Paris, ¹⁴_{Mar. 30, '96} reported two cases of progressive muscular atrophy (Aran-Duchenne variety) due to chronic poliomyelitis. There were to be noted in these two cases (1) the duration (ten and eighteen years) and (2) complete absence of changes in white substance and neuroglia. The author thinks that when the changes are acute in the nerve-cells there is consequent irritative alteration of the neuroglia around them, as well as of that around the fibres of the white substance derived from them. On the other hand, no irritative action exists when the destructive process of the cells is very slow; hence the unchanged condition of the neuroglial tissue in myelopathic cases of slow development.

R. Barclay Ness, of Glasgow, ²¹³_{Aug., '96} cites a case of muscular atrophy of hands and forearms occurring in a woman of 24, the

fingers being especially powerless and the left side more affected than the right. The author looks upon this case as one of true progressive muscular atrophy, and not of simple idiopathic muscular atrophy. He founds his opinion upon the following facts: 1. No such affection exists in any other member of the family. 2. Atrophy and impotence first affected the hands. 3. The patellar reflexes are increased.

Wilson and Macdonald⁸⁶ each presented a case of progressive muscular atrophy to the Edinburgh Royal Medical Society. The first case was that of a former soldier, aged 46 years, who, during service, had been attacked by various diseases (dengue, malaria, dysentery, syphilis, rheumatism). During convalescence from pneumonia he remarked that he could no longer take hold of a glass. Weakness of muscles, abnormal sensations in the region innervated by the ulnar nerve, and wasting of muscles of the hand, with twitching and tremor, especially of interossei and thumb muscles, were present. There was no diminution in movements of wrist, elbow, and shoulder. Macdonald's patient was a mason, aged 37 years, who had been a stone-cutter, but had given up that occupation on account of weakness, developing first in the right elbow, later in the left thumb. The extent of finger-movements was diminished, as well as of wrist, elbow, and shoulder; and the muscles were atrophied.

Phulpin, of Paris,²¹² in a study on scoliosis and muscular atrophy in sciatica, states that he has seen eighty-three cases of the affection, and that he looks upon scoliosis as almost constantly present with it. He chooses the flank which has decreased in height by which to indicate the direction of the scoliosis, this being crossed, homologous, or alternating, according as the curve is arched to the side opposed to the sciatica or on the same side, or even is susceptible of changing its direction. Homologous scoliosis is not uncommon, but alternating scoliosis is an anomaly.

In addition to the generalized trophic disturbances and muscular atrophies to be met with in patients suffering from sciatica, the author insists upon circumscribed, or partial, amyotrophies, which usually are localized in the gluteal region. Isolated atrophy is also very common in the calf-muscles.

B. Sachs, of New York,²⁴² observed a young woman suffering from muscular dystrophy of facio-scapulo-brachial type. In showing her teeth she succeeded in slightly moving the lower lip, but not the upper. The eyelids were almost similarly affected. There were to be noted partial atrophy of the serratus magnus, pectoralis major and minor, and of the rhomboidei, and hypertrophy of the supra- and infra-spinati. The arm could not be

raised to an horizontal position. Sachs removed a small portion of the infraspinatus and observed microscopically a great increase in adipose tissue; hypertrophy of some of the muscular fibres, but atrophy of the greater portion; and degeneration of the nerves.

Berend⁶_{Sept. 14, '96} cites the case of a girl, aged 12, who, two years previously, had suffered from a violent attack of influenza, followed some weeks later by sharp pains in the face. Emaciation of the left side of the face was noted, extending as far as the angle of the mouth, and on the right side of the face below the angle of the mouth. The alterations seemed to be more intense in the skin and subcutaneous tissues, but the bones were likewise affected to a certain extent.

Jolly⁴_{Jan. 7, '96} reports the case of a child, aged 14, suffering from grave pseudoparalytic myasthenia. The first symptom was ptosis of the eyelids, followed by loss of strength in the legs, arms, neck, and lips, with trouble in swallowing. No atrophy was present, but hypertrophy of the affected muscles, with loss of strength of all voluntary muscles. After a period of rest muscular energy re-appeared. Julius Schnitzler³³⁶_{Mar. 9, '96} reports the case of a man, aged 20, suffering from circumscribed muscular degeneration of traumatic origin. P. Shuster⁷⁵_{Sept. 1, '96} describes a case of combined progressive paralysis and progressive muscular atrophy from Mendel's clinic.

Thomsen's Disease.

Dejerine and Sottas, of Paris,¹⁴_{June 5, '96} performed an autopsy on a patient suffering from Thomsen's disease. They noted that the initial lesion is muscular hyperplasia and that hypertrophy is found mostly in those muscles which perform the greatest amount of work. The authors attribute to this hypertrophy a functional origin, and the integrity of the nervous system induces them to classify this disease among primary myopathies. O. Hollmann,¹³_{Jan. '96} reports the case of a man in whose family Thomsen's disease was hereditary. The first symptoms showed themselves at the age of 6 years; they were present at the onset in winter only, the patient being in good health during the summer.

J. A. Van der Stok,⁴⁵⁴_{Oct., '96} surgeon in the Dutch army, considers this affection from the stand-point of legal medicine and asserts that the disease renders those who are affected by it unfit to serve as soldiers. He suggests that it be placed among the causes of unfitness for military service.

Dupuytren's Disease.

Bieganski¹⁴_{Sept. 18, '96} cites a case of Dupuytren's disease, with autopsy. He was able to assure himself that the fixed flexion of

the fingers was due neither to a shortening of the tendons nor to articular adhesions; the skin was closely united to the fibrous bands noted during life; the subcutaneous cellular tissue of the palm of the hand had completely vanished and the palmar aponeurosis was retracted. In the spinal cord were found gliomatous formation in the region of the central canal, some syringomyelia, and anterior poliomyelitis, with chronic leptomeningitis. The author is inclined to admit some connection between the alterations of the hands and the medullary lesions.

Acromegaly (Giant-growth).

Etiology and Pathology.—Kalindero, of Bucharest, ⁹⁹⁶_{Oct. 25, '94} cites two cases of acromegaly. The first case was that of a man of 40, in whom the first symptom developed at the age of from 25 to 28 years. The hands and feet were enormous in size and thickened; the forearms and arms almost normal; the nose large, upper lip thickened, lower lip drooping; lower maxillary bone increased in size, chin projecting forward, marked prognathism; tongue increased in size; words articulated with difficulty; pronounced cervico-dorsal kyphosis; enlarged thorax, sternum much inclined, Erb's retrosternal dullness; sexual appetite preserved, no cephalalgia, and enormous appetite. The second case was that of a woman, aged 40 years, in whom the affection appeared at the age of 21 years, after pregnancy. The menses remained absent. Cephalalgia had been exceedingly acute for a long time, increasing on certain days into intense real attacks; it had, however, disappeared at the time of report. Roswell Park, of Buffalo, ⁴⁵¹_{July, '96} cites the case of a man, aged 42, whose symptoms began toward the age of 25. There was hypertrophy of the hands and feet, the bones, cartilages, and soft parts being all equally affected. In the popliteal space was a cystic tumor communicating with the joint, containing, besides synovial fluid, five small, solid masses, three being of the size of a cherry, the two others a little larger, and which Park recognized as foreign bodies of the knee-joint.

George R. Murray, ²_{Feb. 1, '96} treated three cases of acromegaly. One of the patients also suffered from retraction of the palmar aponeurosis and dullness at the right apex. He had shown symptoms of tuberculosis twelve years previously. W. B. Ransom, of Nottingham, ²_{June 1, '96} noted, in two women suffering from acromegaly, premature cessation of the menses, as well as hypertrophy of the pituitary body. He adheres to the theory that this affection depends on disturbance of the normal functions of the pituitary body.

Samuel S. Adams, ⁵¹_{Dec. '94} observed a case of congenital hemi-

hypertrophy, involving the face, tongue, tonsil, and scrotum, as well as the skeleton and soft parts, in a child of 10 years.

Lancereaux, of Paris, ³_{Feb. 10, '96} in a lecture on trophoneurosis of the extremities, or acrotrophoneurosis, described acromegaly under the denomination of "acromegaly trophoneurosis." He showed a patient who presented exophthalmic goitre and glycosuria, together with acromegaly.

E. Hertel, of Jena, ¹¹⁵³_{July 14, '96} calls attention to certain ocular disturbances to be met with in acromegaly, such as thickening of the eyelids, prominence of the orbital ridges, and exophthalmia. The nervous apparatus of the eye may be disturbed by periorbital pains, hypersecretion of tears, pupillary disturbances, nystagmus at times, limitation of the ocular movements, paresis of the oculo-motor nerve, and insufficient convergence.

Tamburini ¹⁶_{Aug. '96} believes that acromegaly is partly caused by changes of the pituitary body. During the first period of the affection there is hypertrophy of the gland, with exaggeration of its functions, while the later cachexia results from abolition of those functions.

Robert Massalongo, of Verona, ⁶⁸_{June, '96} reveals the fact that in 1892 he published the theory of acromegaly and giant-growth, upheld by Tamburini, Brissaud, and Meige.

Schlesinger ³_{Jan. 30, '96} showed before the Medical Society of Vienna an acromegalic patient suffering from paralysis of the right oculo-motor nerve, gray atrophy of the discs, and hemianopia. Mercurial inunctions caused an improvement in these symptoms. The patient was not syphilitic. A. H. Benson ²⁶_{Dec. 26, '94; Aug. 2, '95} also discusses the ocular complications of acromegaly, and adduces as factors hypertrophy of the pituitary body, with compression of the chiasm.

E. Brissaud and Henry Meige, of Paris, ²¹²_{Jan. 25, '96} observed a case of acromegaly associated with giant-growth. The patient, a man aged 47, was of ordinary stature until his sixteenth year; he then began to grow in an exaggerated fashion, remaining in good health; at 21 he measured 2 metres 12 centimetres in height, and his stature increased 8 centimetres more. Toward the age of 37, while lifting an exceedingly heavy weight, he experienced a violent pain in the back. Thenceforth he was compelled to give up arduous labor and determined to profit by his stature and to exhibit himself as a giant at public fairs. Owing to a deformity of the spine which has developed he now measures only 1 metre 96 centimetres in height. His intellect is slow and dull, his disposition sombre, and he is hard to please. There is complete disappearance of sexual appetite. His arms, which are out of proportion, hang half-way down his legs, and, with his body bent

forward, his prominent cheek-bones and chin give him the appearance of a huge anthropoid ape. The conclusion drawn by the authors is that acromegaly is giant-growth in the adult, and that giant-growth is acromegaly of adolescence. Adler, of Berlin, ³¹_{Feb. 2, '96} cites a case of progressive partial giant-growth in a girl of 8 years. He points out that in congenital giant-growth most frequently a hand, a foot, or several fingers are increased in size. Giant-growth of an entire extremity is uncommon, crossed giant-growth exceedingly uncommon. Patients suffering from the affection present other congenital deformities,—varicose enlargements, abnormal pigmentation, etc. The general state of health is not affected.

A patient of Nobl ¹⁴_{Aug. '96} suffering from hereditary syphilis presented a singular development of the skeleton, there being a considerable length of the diaphyses of the long bones, marked development of the diaphyses at the wrist and elbow, and widening of the terminal phalanges of the fingers. Marked albuminuria, reaching 6.5 grammes (1½ drachms) per litre (quart), was present, disappearing under the influence of antisiphilitic treatment.

G. Marinesco ¹⁴_{Jan. 25, '96} gives an account of a female patient, aged 30 years, who at 22 suffered from epileptiform attacks, occurring three or four times a week, without aura, and progressively diminishing in frequency. Five years ago giddiness developed, and six months after a fall from the second floor she observed that her shoes were not large enough; the hand, thorax, and face showed excessive enlargement, while there was great thirst, exaggerated appetite, and abundant urine staining the linen. General weakness was simultaneously noted. The author asks what influence traumatism may have upon the development of symptoms of acromegaly and diabetes.

M. Allen Starr, of New York, ⁵_{Dec. '94} observed a woman of 52 years suffering from a trophic lesion analogous to acromegaly, the chief symptoms of which consisted in gradual and progressive enlargement of the head and neck. The author proposes to give the denomination of “megalocephaly” to this affection.

Woods Hutchinson, ⁵_{Aug. '96} in performing an autopsy on a giant-ess, noted excessive development of hands, fingers, feet, jaw, nasal bones, and frontal sinuses, hypertrophy of the pituitary body, and enormous dimensions of pituitary fossa.

Middleton, of Glasgow, ²¹³_{Aug. '96} reports the case of a woman, aged 34 years, suffering from acromegaly. Three years before she had had a child and had remained bedridden for five weeks through excessive weakness. About six weeks after delivery she perceived that her eyes were swelling; soon her face changed in appearance and the features increased in size. Menstruation ceased. Treat-

ment by extract of thyroid gland was without appreciable result. E. L. Bullard, of Waukesha, ¹⁹_{Apr. 27, '96} reports a case of acromegaly in a woman of 51 years who had not menstruated since her last delivery, nineteen years before. The abnormal development of hands, feet, nose, and chin had begun about ten years previous to the report, at which time there was severe cephalalgia. The affection had reached the ears, nose, lower lip, tongue, inferior maxillary bone, hands, feet, clavicles, ribs, sternum, patella, and pelvic bones. Prognathism was present, the neck was short and thick, and the thyroid gland was increased in size and of cartilaginous consistency. The cervical veins beat violently. Cervico-dorsal kyphosis and diminution of visual acuity, polyphagia and polydipsia, and at various times sugar and albumin in the urine were also noted.

Unverricht, of Magdeburg, ³⁴_{Apr. '96} reports the case of a man of 31 years who suffered from nervous and muscular disturbances following traumatism. Close examination showed characteristic broadening of the hands, feet, and skull. The physiognomy was altered and bitemporal hemianopsia found. The physicians who had first examined the patient had suspected a traumatic neuritis.

Peppo Acchioté ²³²_{Sept. 30, '96} publishes an account of a child suffering from facial hemihypertrophy. Even from birth the child presented a slightly-accentuated facial asymmetry, which began to increase some months later. At 3 years of age, when the author first saw the child, the left side of the face struck one at first sight by its abnormal development as compared with the right side, the skin, adipose tissue, muscles, sensory organs, and skeleton being much more developed. The circumference of the cranium, from the root of the nose to the external occipital protuberance, measured twenty-three centimetres on the left side and only twenty centimetres on the right side. The intellect was not equal to that of a child of the same age. The child could with difficulty utter a few words, usually unintelligible; he was not, however, an idiot, but comprehended very well what was said to him. There were no symptoms of hydrocephalus, nor did convulsions exist. Neither syphilis, alcoholism, nor rachitis was noted in the parents.

Herman C. Gordinier ⁹_{Sept. 17, '96} publishes two cases of acromegaly. In one patient, aged 77 years, the affection had begun five years previously with frontal and occipital cephalalgia, attacks of giddiness, and loss of memory. The headaches and giddiness have persisted with the development of the disease. The second patient, aged 63, had experienced neither headaches nor giddiness and could not exactly indicate the date of onset. He noticed, one day, that his hat had become too small. He now and then suffers from facial neuralgia.

Treatment.—Nothing has proved of much value in this condition so far. Cafon,²_{Feb., '96} treated a case by extract of the pituitary body, without any appreciable result. In view of the analogy between myxœdema and acromegaly he tried extract of thyroid gland, with rapid improvement.

Raynaud's Disease.

Etiology and Pathology.—J. Hutchinson¹⁰⁷⁷_{Nov. 23, '94} observed symptoms of Raynaud's disease in a woman of 62 years who had always enjoyed excellent health. He calls attention to two forms of symmetrical gangrene which should not be confused with Raynaud's disease. In one case a male patient lost the tips of his fingers and toes, the tip of his nose, and the border of his ears; elimination of the diseased tissue having taken place, circulation was completely re-established. This is never the case in true Raynaud's disease. In another patient the skin became adherent to the subjacent tissues, showing that the disease was scleroderma, and not Raynaud's disease.

A. Chauffard, of Paris,¹⁰⁰_{July 16, '96} observed a woman who eight years previously had experienced typical symptoms of Raynaud's disease. For fifteen months the phenomena developed and increased in intensity. The disease then revealed itself under a new aspect by the rapid development of a sclerodermic facial mask, accompanied by atrophy of the tongue, more marked on one side than on the other. Raynaud's symptomatic complexus was the first to appear and masked at its onset the true nature of the pathological process; the evolution of the disease, instead of tending toward gangrene, was in the direction of dermic sclerosis.

J. G. Kiernan, of Chicago,¹³⁹_{Nov., '94} has often noted the symptoms of Raynaud's disease in insane patients, especially in the various forms of stupor. The pain which results may, in patients suffering from melancholia or paranoia, become the starting-point of a persecution delusion (electricity, witchcraft). The affection is frequent in cases of stupor following acute mania. Urquhart, of Perth,⁸⁶_{Mar., '96} has seen two cases of Raynaud's disease in the James Murray Royal Asylum. They are the two solitary examples which he has met with in any establishment devoted to the cure of the insane during twenty-one years' experience. Clouston has observed cases of Raynaud's disease only in acute mental diseases. Since various trophic disturbances occur, such as hæmatoma of the ear, localized gangrenes should also be met with.

L. Defronce,¹¹⁵³_{June 1, '96} publishes a case of symmetrical gangrene following erysipelas migrans. The case was interesting from the slight development of Raynaud's symptoms (local syncope and

asphyxia), the sudden onset of the pains, the cutaneous eruption, the rapid progress of the gangrene, and the depth to which the lesions reached,—entire phalanges being affected,—and, finally, by the muscular atrophy present. Angelesco likewise reports a case of symmetrical gangrene of the extremities following erysipelas.

Leopold Levi, of Paris, ⁸⁴_{Jan. to Mar., '96} states that a certain variety of Raynaud's disease is purely hysterical. Acute rheumatic fever is often found among the antecedents and may act as a localizing cause for hysteria. The onset is sudden and the origin due to some emotion. Levi maintains that the *urinary* and *cephalic* disturbances are in favor of the theory of a central origin. He also calls attention to the presence of asphyxia of the extremities in lipomania, progressive general paralysis, and especially in circular insanity. He advises hypnotism as allowing a precise diagnosis of the immediate cause of the affection and as a means of obtaining recovery. Narath ¹⁴_{Feb. 20, '96} has seen a number of cases of symmetrical gangrene of the extremities. He gives an account of two female patients suffering from hysteria who had symptoms analogous to those of Raynaud's disease, but whom a careful examination showed to be suffering from artificially produced lesions.

Ch. Colson ²⁹³_{Aug., Sept., '94} showed before the Medico-Chirurgical Society of Liège a child of 4½ years, in whom three distinct lesions were to be noted,—insufficiency of pulmonary orifice, chronic nephritis, and spontaneous gangrene of extremities of the left hand. Schlesinger, of Vienna, ³_{Mar. 15, '96} thinks that the idiopathic variety of Raynaud's disease, five cases of which he has seen, is clearly to be distinguished from the symptomatic variety by the fact that it symmetrically affects the upper extremities, that the gangrene is circumscribed, and that panaris predominates.

Didier ²⁰⁸_{Aug. 1, '96} describes the case of a girl of 19 years, who had suffered a long time from symmetrical gangrene of the extremities and from various sclerotic lesions of the skin. After exposure to cold she was attacked by pneumonia followed by pulmonary gangrene, which, even to the end, did not present the characteristic odor of breath and of expectoration. Diagnosis was made only by the expulsion of a fragment of mortified pulmonary tissue and the consequent formation of a gangrenous pulmonary cavity.

C. E. Stanley, of Middletown, ²⁴²_{Jan., '96} observed, in a woman of 35 years, a case of "dead finger" of four and one-half years' standing. The patient one morning experienced a feeling of numbness in one hand and noted that the index finger was cold and bloodless, with lowering of the temperature and loss of feeling. These symptoms disappeared in two hours, hot dressings having been applied, but the former strength did not return to the finger.

Similar attacks, of greater or less duration, showed themselves at intervals, affecting the same finger and the corresponding finger of the left hand. Finally, the other fingers of the hand, and at last some of the toes, were in turn affected. Mental phenomena were also simultaneously noted.

De Renzi, of Naples,⁸¹⁹_{Nov. 17, '94} discussed the differential diagnosis between Raynaud's disease and erythromelalgia. In the latter disease attacks show themselves in summer especially; there is rise of temperature, perspiration, and redness; Raynaud's disease is observed principally in winter, with lowering of the temperature and a feeling of cold.

E. Weiss,⁸⁶⁸_{May 11, '96} has observed that the arteries of the affected part in Raynaud's disease are obstructed by blood-clots which have become fibrous. Sections show that thrombosis develops from the periphery toward the centre. The starting-point is a lesion of the tunica externa or adventitia. An infiltration of perivascular connective tissue accompanies the affected vessels as far as the capillaries. The vascular sheaths are blended with the perineurium, which has undergone sclerotic transformation, invading the fasciculi of neighboring muscles. Weiss thinks that the term "endarteritis obliterans" should be replaced by that of "arterial thrombosis."

Treatment.—Krisowski,⁸⁶⁶_{May 20, '96} attended a child of 3 years, suffering from hereditary syphilis, in whom, whenever he was exposed to the open air, attacks of local asphyxia of the fingers occurred. A spot of gangrene showed itself on the ears. Specific treatment caused the accidents to disappear (mercurial inunctions and potassium iodide internally).

John A. Batton,¹¹⁹_{Mar. 20, '96} reports Raynaud's disease in a child of 3 years, the symptoms disappearing under treatment by trinitrin.

Beriberi.

Etiology.—Albert S. Ashmead, of New York,⁵⁹_{Nov. 24, '94} on inspection of a ship arriving at Perth Amboy, noted a rather large proportion of cases among the negro passengers; the health of the European crew was good. He believes the disease to have been due to an accumulation of carbonic oxide in the negroes' quarters, which were almost without ventilation, while, on the contrary, the ventilation of the whites' quarters was excellent. He also reports a vessel arriving from the Philippine Islands with the whole crew affected with beriberi.¹¹²_{Aug. '96} The cargo was Manilla hemp, which ferments during the voyage. He examined,⁵⁹_{Oct. 1, '96} a bark arriving from India, the entire crew of Europeans having been attacked by the disease. The cargo consisted of 800 tons of cocoa-nut fibre.

It is to the fermentation of this fibre that Ashmead attributes the outbreak of beriberi on this vessel.

Mossé and Destavac, ¹⁰⁸⁸_{Nov. 11, '96} in a communication to the Medical Congress of Lyons, maintain that beriberi is a disease *totius substantiæ*, both infectious and contagious in its nature, and most likely due to the penetration into the system or to the recrudescence of a pathogenic, but as yet undetermined, microbe. Changes in the temperature, dampness, fatigue, and insufficient food facilitate the action of this microbe. The infection is followed by a general toxæmia, affecting more especially the nervous system and giving rise to peripheral neuritis, as well as to more or less intense changes in the central nervous system, which, like the remainder of the organism, has been affected. Scheube, ⁹⁹_{Jan. 24, '96} regards beriberi as an infectious miasmatic disease. The prime agent is as yet unknown, but should be sought for in the soil.

Judson Daland, ¹_{Mar. 1, '96} has observed three cases of beriberi occurring among some Egyptian seamen who for three months had had no other food than salt fish and rice. Microscopical and bacteriological examination showed the blood to be free from any parasites. Daland believes the disease to be due to a toxæmia caused by ptomaines derived from special kinds of food. Grall, Porcé, and Vincent, ⁹⁹⁶_{July 10, '96} published an account of two epidemics of beriberi occurring in New Caledonia among two groups of Asiatic immigrants,—in 1891 among Amramites, in 1892 among Japanese. The authors conclude that beriberi is a toxæmia of alimentary origin (rice and fish among Asiatics), and that to bring about recovery the patients must be placed on European rations.

Symptomatology.—As in other infectious disorders, beriberi may present itself under various clinical forms, varying in gravity, in intensity, and in duration, ranging from light and abortive forms to exceedingly serious ones. The symptomatology of the disease as well as its various clinical forms seem to depend essentially upon the more or less marked action of the morbid poison upon this or that part of the nervous system. Invasion is not always abrupt. Grave phenomena may manifest themselves suddenly, but in a subject already showing symptoms of the disease.

C. E. Corlette, of Sydney, ²_{Sept. 28, '96} insists upon two characteristics which he thinks have not yet been noticed. Patients are subject to attacks of perspiration, ordinarily limited to the head, but sometimes general. In addition, two exceedingly sensitive points are to be found on the foot, one toward the middle of dorsal face of the first intermetatarsal space, corresponding to the bifurcation of the internal branch of the anterior tibial nerve, the other at the cuboid protuberance, corresponding to the external saphenous

nerve. The author thinks that previous to any treatment the patient should be withdrawn from the endemic surroundings.

Treatment.—F. X. Dercum ²⁴²_{Feb., '94} read before the Philadelphia Neurological Society an account of three cases of beriberi in colored men who had worked in phosphate-beds. The author is inclined to think that the disease is caused by a microbe of telluric origin. He adds that, even if the microbe is of malarial origin, it is certainly distinct from the micro-organism which is the cause of malaria, for beriberi is an apyretic affection and lacks one characteristic symptom of malaria,—periodicity. Moreover, quinine, so efficacious in malarial affections, is without effect in beriberi.

A. W. Sheperd ⁶_{Sept. 21, '96} remarks that, among the patients attacked by beriberi that he has treated, the anæmic aspect was modified neither by iron nor by arsenic. In the autopsy of one case he found masses of filiform worms in the intestine, especially in the duodenum. He administered large doses of thymol for twenty-four hours, followed, if necessary, by castor-oil. Several weeks of tonics and good food were then sufficient to re-establish the patient.

Miscellaneous.

Nomenclature.—D. D. Stewart, of Philadelphia, ⁵_{Mar., '96} advances the opinion that the convulsive form represents at least two-thirds of the cerebral manifestations of lead poisoning and causes the greatest mortality. He prefers the term “convulsion” to “eclampsia” and “epilepsy,” and pronounces any systematic grouping of the various forms impossible. There are, however, cases—two of which have been seen by the author—where convulsions, originally symptomatic of lead poisoning, have, later on, assumed the character of so-called idiopathic epilepsy. The period elapsing between first exposure to the action of lead and the development of cerebral symptoms varies and depends on different factors, the principal ones being personal susceptibility and intensity of poisoning. Sometimes convulsions supervene with surprising rapidity; less frequently they occur only after several years, and follow various manifestations of lead poisoning. Maunz ³_{Aug. 15, '96} describes the etiology, symptomatology, and treatment of myositis ossificans, recalling the fact that but thirty-two cases are reported in medical literature. N. Senn ²³³_{Aug. 20, '96} looks upon myositis ossificans as an unsuitable term, the periosteum being the starting-point of the affection, which only later extends to the muscles. These act temporarily as scaffolding for the osteogenetic tissue. Mergier, of Paris, ³_{Aug. 21, '96} proposes a new notation for the electrical examination of nerves and muscles. The poles are designated by the signs + and —. The letters employed to denote the words “shock”

and "contraction" are simply suppressed. He also proposes to replace the term "opening" by a white circle, the term "closure" by a black circle or one marked by cross-hatching.

Paræsthesia.—Bernhardt³¹⁹_{Sept. 14, '96} describes a case of isolated paræsthesia of the external cutaneous nerve of the thigh. This paræsthesia is consequent upon some form of toxæmia, of infection, or a cold. Devic¹⁷_{Aug. 4, '96} gives an account of a case of paræsthesia of the external cutaneous nerve, or Bernhardt's paræsthesia. Paul Bellot, of Niort,²¹²_{Sept. 25, '96} has seen a case of paræsthesia of the external cutaneous nerve in a woman of 48 years, who complained of numbness and loss of feeling in that part of the left thigh corresponding to the nerve; these were exaggerated by walking and standing and diminished by rest. Motility of the muscles was intact.

Malarial Peripheral Disorders.—Faivre, of Bordeaux,¹⁸⁸_{Sept. 22, '96} observed two cases of peripheral nervous disturbances due to malaria.



FIG. 1.—AUTOCOPIC TROPHONEUROSIS. (LANCEREUX.)
Semaine Médicale.

The first patient had left Algeria on account of anæmia of malarial origin; during the crossing he suffered every day at the same hour from painful cramps in the calves of the legs, which would leave him in about half an hour upon the simple application of cold water. These phenomena persisted and assumed the following aspect: Slight premonitory fever, tingling of the toes, feeling of constriction of the calf-muscles as if held in a vice, increasing progressively in intensity to such a degree that the patient could finally make only monosyllabic answers, while he was simultaneously drenched with perspiration. At that moment the symptoms would diminish in intensity and disappear, the patient returning to the normal state. With the exception of this period of crisis there were no motor disturbances, but regions of anæsthesia were found in various parts of the body, a casque-like cephalalgia and narrowing of the visual field. Injections of quinine hydrochlorate were followed by rapid improvement. The second patient, after an attack of pernicious

fever in the Soudan, developed sensory-motor disturbances of the lower right limb, especially affecting the foot. Atrophy of the muscles of the leg was noted, with sharp pain on pressure along the course of the deeper nerves, with spontaneous shooting pains, so much increased at night as to prevent sleep. Very marked hyperæsthesia of the soles of the feet prevented locomotion. The foot and lower portion of the leg were cyanotic in hue, as in asphyxia of the extremities. No sensory disturbances were noted in other parts of the body, nor were any other nervous symptoms present. Treatment by quinine was not followed by much improvement.



FIG. 2.—AUTOCOPIC TROPHONEUROSIS. (LANCEREAUX.)
Semaine Médicale.

Trophoneurosis.—Lancereaux, of Paris, ³_{Sept. 28, '94} describes, under the denomination of autocopie trophoneurosis, those special disorders which have for the chief characteristic the loss of toes and limbs. They reveal themselves under two forms, one known under the denomination of spontaneous amputation, the other under that of aïnhum. Autocopie trophoneuroses are, from their progressive nature, serious affections of grave prognosis. The means used to arrest them should be directed to the nervous system, whence arises the primary disturbances. (See Figs. 1, 2, and 3.)

A. Chipault, of Paris, ¹¹⁵³_{Sept. 14, '96} tried stretching of the nerves corresponding to the cutaneous region attacked in 5 cases,—2 of perforating ulcer due to peripheral neuritis and 3 due to medullary disturbances. These patients had been treated for years without success, but by this method the ulcerations and accompanying trophic disturbances disappeared in a few days.

Treatment.—Gingeot, of Paris, ⁸⁵_{Jan. 12, '96} advises injections of artificial serum in some cases of nervous disorders. It is a harmless treatment which may act through suggestion. G. Dumont ⁸²_{Sept., '96}

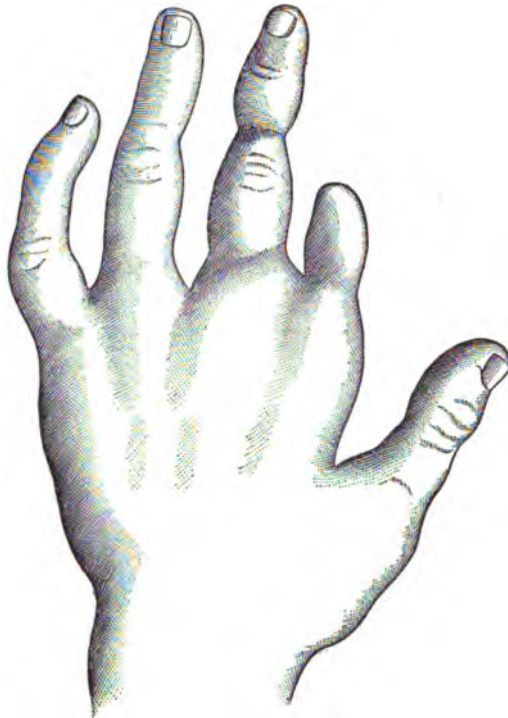


FIG. 3.—AUTOCOPIC TROPHONEUROSIS. (LANCEREAUX.)
Semaine Médicale.

considers the use of a toxin in nerve-therapeutics, basing his theory upon the rapid suppression of nervous disturbances frequently noted on the occurrence of a disease due to microbes rapidly producing toxins which at once penetrate the system (streptococcus of erysipelas, pneumococcus, etc.). In a certain number of cases he has made use of the toxin of the streptococcus in doses of 1 cubic centimetre ($15\frac{1}{2}$ minims) at intervals of from three to fifteen days. No local accidents occurred. In two patients—one suffering from paralysis agitans, the other from epilepsy—a notable improvement took place.

MENTAL DISEASES.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

GEORGE H. ROHÉ, M.D.,

ASSOCIATE EDITOR,

SYKESVILLE, MD.

General Considerations.

[The work of Andriezen and Berkley, abstracted below, has done much to clarify our knowledge of the minute anatomy and pathological histology of the brain. While much is still indefinite and vague, clearer vistas are opening up, and we may hope, with modern methods of research, to explain, in the near future, many of the complex problems of psychical activity, both in health and in disease.—G. H. R.]

THE newer aspects of the pathology of insanity are considered by W. Lloyd Andriezen, of London, ⁴⁷_{p. 440} in an exhaustive paper. After reviewing the labors of Hughlings-Jackson, Fritsch and Hitzig, and the more recent histological researches of Golgi and Ramón y Cajal, the author refers to the doctrine of the neuron and the interrelations of the neurons within the central nervous system as the foundation for possibilities in nerve-activity which may develop into the most elaborate forms of movement and conduct. The whole complex of cortical neurons is so disposed that they may deal with the nerve-currents of the various sensory excitations, elaborating the various physical states or mental acts. The cortical areas are themselves complex structures, yet in each cluster the individual neuron preserves not only its integrity as distinct from other neurons, but also its threefold character as a nutritive and dynamic doubly-connected apparatus. In the cortical type of nerve-mechanism lies the basis for every form and quality of sensorial, psychomotor, and psychical life. The observers named had so far restricted their labors to the brains of young and newly-born animals; the author's results stand alone, therefore, as far as the human brain goes. He classifies the brain into three groups of elements: (1) the neurons; (2) the nutritive elements,

(D-1)

—lymphatic, vascular, secretory, etc.; (3) the protective elements. A fourth might perhaps be added,—the ground-substance.

The neurons of the cortex Andriezen proposes to classify into four layers, which are shown in the wood-cut: (1) the molecular layer, *M*; (2) the ambiguous layer, *A*, differing from that referred to in the classification of Meynert and Obersteiner; (3) the long

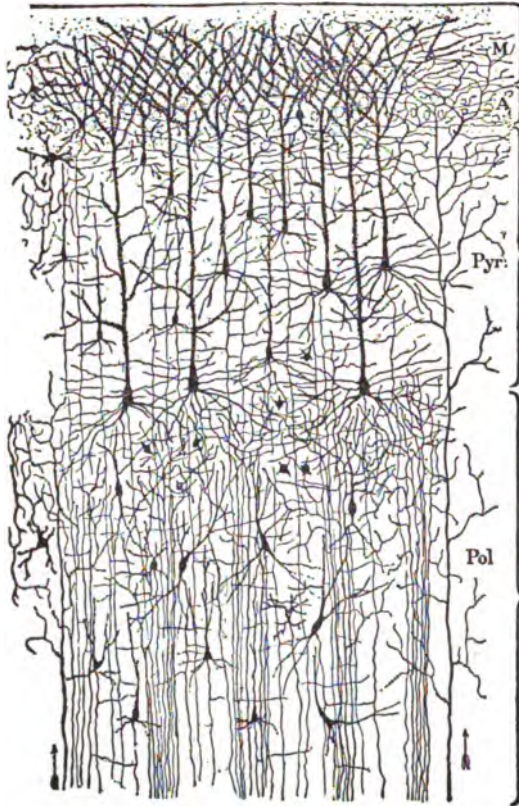


FIG. 1.—STRUCTURE OF CEREBRAL CORTEX IN MAN, SHOWING THE NERVOUS ELEMENTS ONLY. (W. LLOYD ANDRIEZEN.)

Brain.

pyramidal layer, *Pyr*; (4) mixed pyramidal or polymorphic layer, including Meynert's layer plus spindle-layers, *Pol*.

As to the psychical accompaniments of nervous activity the action may be described as follows: The excitation arriving at the cortex *via* the olfactory, optic, fillet, or other projection system spreads out in the molecular and submolecular layers of the primary cortical area, which it enters where these fibres terminate.

Here it affects two intrinsic sets of cortical elements,—the ambiguous and long pyramidal; these cortical elements are thereby roused to activity and discharge in their turn. The excitation, rise of tension, and discharge of the conjoint ambiguous pyramidal elements thus effected form the “nervous process,” the psychical counterpart or accompaniment of which is a sensation aroused in the mind. Such a sensation may be faint or vivid in intensity, according to the intensity of the cortical reaction in the primary cortical centre. Similarly, according to the locality and peripheral connection of the centre, the sensation may be visual, tactile,

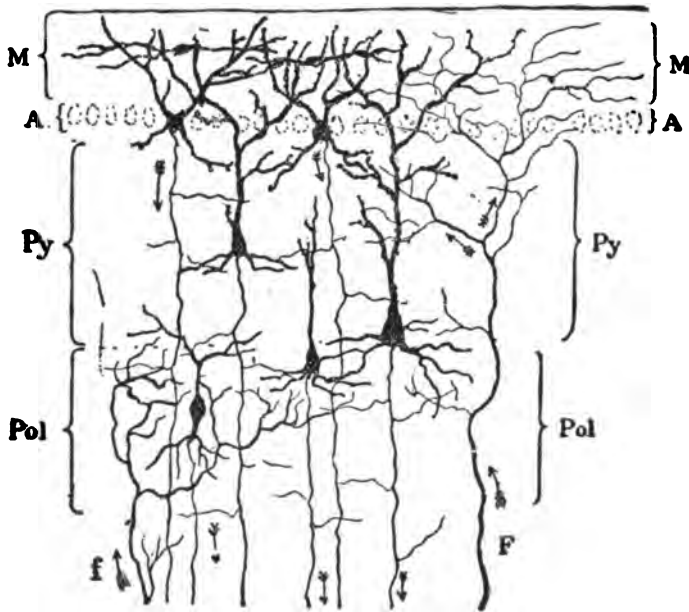


FIG. 2.—DIAGRAM ILLUSTRATING THE NERVO-PROTOPLASMIC CONNECTIONS IN THE CEREBRAL CORTEX. (W. LLOYD ANDRIEZEN.)

Brain.

gustatory, olfactory, kinæsthetic, etc. That such an excitation of a primary sensory area of cortex is accompanied by its appropriate psychical sensation is a well-established fact. Thanks to the labors of Fritsch, Hitzig, Charcot, Nothnagel, Wernicke, Ferrier, Allen Starr, and others, the cortical field for Jacksonian epileptics has been considerably extended, and now includes all the areas mentioned.

The nervo-protoplasmic connections in the cerebral cortex are illustrated in Fig. 2. *M* shows the molecular layer, or field of association, between the subjacent ambiguous long pyramidal cells,

on the one hand, and the distribution of incoming nerve-fibres, on the other. One such nerve-fibre, *F*, is a projection fibre, another, *f*, an association fibre. *A* represents the ambiguous layer and *P_y* the pyramidal layer. The latter shows two long pyramidal cells and their apical distributions in the molecular layer. *Pol* is the polymorphic layer. Two cells, a short pyramidal and a fusiform cell, are shown. The arrows indicate the directions of the nerve-currents.

Just as when a kinæsthetic centre is aroused, the psychical counter-process that is evoked is a sensation referred to this or that peripheral movement which is in relation to the said centre; so, if the focal discharge be stronger, it issues downward *via* the pyramidal cells to the bulbo-spinal motor centres, producing thereby movements of the face, tongue, hand, or foot, according to the site and locality of the cortical epileptogenous focus. And similarly, with a focal discharge occurring in this or that special-sense area, we have aroused its psychical accompaniment,—viz., an hallucination of this or that special sense: gustatory, visual, olfactory, auditory, etc. We have thus kinæsthetic epilepsies; we have also special-sense epilepsies, and—to complete the picture—we may add that we have psychical epilepsies. Not that the other epilepsies are non-psychical, for each and every one of them has its own psychical counterpart,—viz., a feeling of cutaneous excitation, or of a peripheral movement, or the excitation of one or other special sense. But in the psychical epilepsies in the stricter sense of the word there is a disturbance of a more distinctively psychical nature, consisting of a moderate mental disturbance (bewilderment, sudden loss of memory, stupidity, and a dreamy state, or a reminiscence of certain ideas), or of a more serious violent and maniacal excitement,—an intense furor in which the patient may do the wildest and most terrible deed, murder or even suicide, as the result of the intense cerebral (psychical) discharge affecting the higher regions of the brain. We cannot exclude this form—psychical epilepsy—from the category of the other epilepsies; our aim and object should rather be, in following the light we now have, to work out its localization in the brain, to ascertain what area or what set of cortical elements is the seat of such epileptic discharge.

To illustrate the law of pathogenesis the author selected the insanities of chronic alcoholism, and dealt especially with the clinical phenomena of amnesia, incapacity for attention; easily-induced fatigue, insomnia, and muscular weakness; and tremor, which patients exhibit in various grades. Alteration and destruction of the fine, naked collaterals and nerve-terminals are

shown to exist in the molecular layer, and also swelling and softening of the very minute protoplasmic granules attached to the special processes in the superficial layer of the cortex. These changes the author classifies as dynamical, because they affect the nervo-protoplasmic plexuses only, in the first place, such nervo-protoplasmic plexuses being the "field of association" between cortical neuron and cortical neuron or between cortical neuron and the nerve-fibres (sensory pathways) arriving in the cortex from the outside. Co-extensive with these dynamical changes there are other changes within the cell-body and nucleus of the cortical cells which could be spoken of as nutritive changes, changes which had hitherto been shown to exist in other cells (muscular, glandular, etc.), but which had remained insufficiently recognized in connection with clinico-psychological manifestations.

F. X. Dercum, of Philadelphia, ⁶¹_{July 16, '96} reviewed the *status presens* of the pathogenesis of insanity as a whole. As Andriezen had shown, we were not in a position to correlate symptoms with change of structure; at least, in certain forms of insanity. In alcoholism, as shown, there are not only evidences of gross and general nutritive changes in the cell-bodies, but also alteration and destruction of the fine, naked collaterals and nerve-terminals of the molecular layers of the cortex. These changes explain the diminished sensitiveness of the alcoholic subject to impressions from without, and also the general loss of memory and lack of association of ideas. This is the first instance in the history of insanity in which it has been possible to correlate, closely, structural change and symptom. While such results are sufficient when the poison producing the changes is definitely known, microscopical examination cannot, however, in Dercum's opinion, give us all the information that we desire when the initial cause is not known. At most, it can only reveal to us the effects of pre-existing causes, leaving us in the dark as regards the causes themselves. This fact led to the consideration of the subject from another aspect. The conviction is steadily growing in the medical mind that the actual agents which produce tissue changes are chemico-toxic substances of one kind or another; some of them are absorbed or ingested from without; others are poisons produced by altered tissue metabolism, while others still are poisons elaborated by bacteria. Briefly, the various intoxications of the nervous system resolve themselves into two great groups: 1. The auto-intoxications, properly speaking, which embrace, first, the substances normal to the blood and secretions, but present in excess; then, those substances due to general disturbance of tissue change which we meet with in diathetic conditions;

and, last, the poisons formed by the disordered action of special viscera. 2. In the second group we have those substances absorbed from the intestinal tract, some of which are produced by disordered chemical action and morbid fermentation, and others which are normally excreted by the intestinal tract, but now re-absorbed; then we have the poisons which are the direct results or accompaniments of infection.

It was further pointed out that the various symptom-groups which we recognize as forms of insanity may result from the most diverse agents.

H. J. Berkley, of Baltimore, ⁹_{Nov. 3, '96} suggests the possibility of there being no non-medullated nerve-fibres in the cerebral cortex; at least, none that can strictly be classified as such, the conduction being direct through the fibre to its termination. Naked axis-cylinders ought, he thinks, to be a physiological impossibility in the cerebrum, for their presence could only give rise to irregular overflow of energy with corresponding confusion of thought and action. The psychical, or pyramidal, cells, with more or less long ascending processes, are, on the contrary, distinguished from the other cortical nerve-elements by the wealth of their protoplasmic processes in lateral buds, or gemmules, and it is through these, according to the author, that the axons influence the protoplasm of the dendrons and cells, their uncovered endings coming into close contiguity with the gemmules, whose function it is to receive the nervous impressions of the fibre and to transmit them to the protoplasm of the dendron and thence to the cellular body. Briefly, the pathology of dementia would be the following: The conduction of nerve-stimuli to the cell-corpus being through the medium of the lateral gemmules of the protoplasmic processes, these are specially liable to injury from toxic or morbid influences, and are the first portions of the neuron to atrophy and disappear in certain diseases of the brain. As a result of their atrophy and the consequent loss of function, there is, first, confusion and incoordination of psychical functioning, and, finally, with any widespread degeneration of the cortical elements, permanent dementia.

A. Meyer ²⁹⁵_{B.M.H. 4} states that he has found wasting of the fibres with axis-cylinders in the gray substance of general paralytics (confirming the previous observations of Suczet), in mania and prolonged melancholia, as well as in a case of paranoia with hallucinations. Meyer finds that the delicate fibres in the middle layer of the gray matter are the first to disappear. After them—or sometimes about the same time—the tangential fibres of the outer layer of the cortex and then the elements of the third layer are affected in such a degree that the alteration can be recognized

by the naked eye. This advanced process of degeneration is observed in the last stages of general paralysis.

Beadles¹⁶⁶_{Jan., '96}; ²¹³_{Mar., '96} expresses the opinion that the wide-spread degeneration of the arterial system, so commonly found in the insane, plays a very important part in the pathogenesis of mental aberration. He recognizes the condition in some cases, and to some extent, as a secondary one, but believes that it often has a primary existence and long antedates the onset of the insanity, and that the vacuolation and degeneration of nerve-cells is often a secondary result of the want of proper nourishment of the cell, due to the cutting off of the blood-supply by diseased or occluded arteries. This condition, he considers, is to be attributed to some chemical poison circulating in the blood, such as alcohol, the syphilitic poison, ptomaines absorbed from the intestine, or alkaloidal substances developed in the blood itself.

The granular nodules so frequently found in the ventricles of the insane brain are regarded as owing their origin to an irritative cause, possibly some chemical substance contained in the fluid of the ventricles or present in the blood. This constant irritant acting upon the epithelium causes it partly to degenerate and partly to undergo proliferation, which may commence a down growth into the tissues beneath. The connective tissue undergoes active increase, producing wart-like projections; and, on account of interference with the blood-supply, it degenerates at an early stage; so that its structure becomes granular and amorphous.

Burton,²⁷⁸_{Apr., '96} from an examination of fourteen cases, with particular reference to the leucocytes, concludes that in cases of senile dementia there is, as a rule, an increase in these elements; while in general paralysis there is a marked decrease, and that in cases with a tendency to maniacal excitement there is a great increase.

Theodore H. Kellogg, of New York,¹_{July 6, '96} arrives at the general conclusion that there is, in established cases of insanity, considerable increase in the average frequency of the pulse, both among men and among women. The average obtained from 2172 cases studied was 84.8 in the women and 80.8 in the men, giving a general average of 82.8 in the total number of patients studied. There was irregularity of the heart's action in 5 per cent., intermittence in 2 per cent., and heart-murmurs and heart-lesions in 8 per cent. The sphygmographic studies lead him to conclude that tracings are to be found at some stage of the disease in the vast majority of cases of insanity, due to affections of the cortical and spinal motor and vasomotor centres, to various lesions of the sympathetic, to disorders of the pneumogastric, to peripheral and central vascular changes, to degenerations of central organs, to

toxic agents in the blood, to auto-intoxications, to cachectic and diathetic conditions, to cardiac lesions, and to a great variety of intercurrent causes.

Charles K. Mills, of Philadelphia, ⁵_{Nov., '94}; ⁷¹_{Jan., '96} in an elaborate paper on the infectious processes in mental disease, concludes that specific infection must be included among the causes of mental symptoms and disease which precede, accompany, or follow febrile and other infectious disorders. Much negative evidence can be adduced in favor of acute delirium or acute mania being due to toxæmia—such evidence as is afforded by autopsies which reveal neither gross nor histological lesions. In these cases the toxæmia probably overwhelms the patient before the production of meningitis or other disease.

Analogies with nervous affections which are known, or believed to be of microbic origin,—such as multiple neuritis, myelitis, and chorea,—favor the view that insanities with similar or related phenomena or lesions are also microbic in origin. The evidence afforded by careful bacteriological investigation of cases of acute insanity is thus far meagre, and shows that various micro-organisms may induce the same or similar types of mental disease. The mental disorders of pregnancy and the puerperal state are probably in a considerable proportion of cases toxæmic without reference to childbirth; but it cannot be regarded as proved that a bacillus of either eclampsia or puerperal mania is the sole cause of these affections.

H. C. Wood, of Philadelphia, ⁵_{Apr., '96} suggests the probability that all manias of an acute type, which are not intoxication neuroses and are not due to the presence of organisms in the blood, are divisible into, first, mania proper and, second, confusional insanity; and that each of these diseases becomes, when in its most severe form, an acute delirium. Thus, there would be, first, an acute mania; that is, mild, acute periencephalitis, known, when in its delirious form, as acute delirium,—that is, violent, usually fatal periencephalitis; second, confusional insanity without demonstrable lesion, but probably the result of changes in the ganglionic cells themselves, constituting, in its severest form, an acute delirium, also without demonstrable lesion, but, in fact, due to an exaggeration of the unknown ganglionic or other alteration present in the confusional insanity.

Bianchi and Piccino ²¹²_{Aug., '96} state that investigation confirms their views of the infectious origin of delirium acutum as published in a previous article. ¹⁰⁸⁹_{'96} They report eight cases of hallucinatory delirium, in seven of which recovery or considerable improvement took place, the eighth ending fatally. In the eighth case only did

an examination of the blood reveal the presence of the bacilli which the authors had described in their previous article and which they consider to be characteristic of the delirium bacillare. In all the other cases the blood contained micrococci arranged in chains or grape-like, isolated or in pairs, staining with the usual aniline stains. Among the micro-organisms isolated from the blood the authors noticed the streptococcus pyogenes in four cases and the staphylococcus aureus in two cases.

Heredity and Stigmata.—John B. Chapin¹¹⁹ discussed heredity in its relation to insanity and idiocy, advancing the opinion that physical characteristics are transmitted by inheritance. Knowledge, genius, and culture are not an inheritance, but depend rather on influence, education, and environment. Mental receptivity is transmissible. Psychical qualities are not necessarily an inheritance, requiring favorable surroundings and circumstances for growth and development. Insanity as a disease is not transmissible by inheritance, but may be acquired or evolved from a neurotic heredity as a basis. A neurotic predisposition is transmissible by inheritance, but there is no absolute rule that it will be transmitted in any given case or in any case. In-breeding of neurotic temperaments is most conducive to the creation of neurotic heredity. Idiocy and imbecility may be defects having their origin in consanguineous marriages, prenatal conditions, accidents, arrested development, infantile meningitis, tuberculosis, and lack of potency on the part of one of the parents from unexplained causes.

From observations upon psychopathic families Perugia⁵⁹¹ concludes that the morbid types are not transmitted in psychopathic families in identical forms, but become aggravated in their transmission through the generations. Suicidal insanity only is constantly transmitted to descendants in the same form. Among the various insane types the periodical form is relatively frequent. The somatic signs of degeneracy are much more frequent than in non-hereditary lunatics, but are not aggravated proportionately to the psychical degeneracy. Very often sexual abuses, alcoholism, morphinism, and onanism are concomitant causes aggravating the heredity in these families. Bodily diseases attack the hereditarily insane with more than ordinary frequency. Maternal heredity is propagated to the greater number of descendants. Psychopathic families have a fatal tendency to intermix and fuse among themselves, thus re-enforcing the heredity. The psychopathic heredity affects both sexes equally. Psychopathic families, especially those in whom the heredity is bilateral, are doomed to extinction as much by their great mortality in infancy as the sterility of their marriages.

Malschin, ⁷⁵_{N.A.M.} on the basis of thirty cases observed and others in medical literature, expresses the following views: Among the hereditary insanities there exists a special type marked by early appearing and rapidly progressing dementia (*dementia præcox*), the patients exhibiting signs of physical and psychical degeneration at the age of 17 to 20. The form of psychical disorder that passes over into this early and progressive dementia is generally of a depressive type; other forms, however, may precede it.

Camuset ³⁸¹_{Nov., '94} studies the absence of overlapping of the anterior portion of the upper dental arcade over the lower as a stigma of degeneration. In the white race the dental arcades describe two arcs, which usually are not quite equal and cannot



FIG. 1.—FEATURES OF DEGENERATED INDIVIDUAL. (LEGRAIN.)

Physical conformation regular, and morally a perfect monster.

La Presse Médicale.

be apposed throughout their entire extent. The inequality exists only in the anterior portions. Where, in the normal state, the jaws being closed naturally and at rest, the lower incisors and canine teeth ascend more or less, according to the individual, behind the upper incisor and canine teeth; in one word, the jaws overlap. Overriding of the teeth does not exist in ancient skulls or in modern, but lower mammalian skulls. Overlapping of the teeth is found missing in one-fifth of the insane, while its absence is very uncommon among normal individuals, amounting to but 2 to 3 per cent. The author considers this as an evidence of a stigma of degeneration. Of seventy-seven lunatics examined by him and showing this defect, forty were idiots or imbeciles, while ten suffered from epileptic mania.

Legrain, of Ville-Evrard,¹¹⁵³ speaking of the external symptoms of insanity, states that careful observation teaches that there is no relation between physical and moral deformities. Individuals who, from a moral point of view, are depraved may be regular physically, and *vice versa*. He illustrates this by the woodcuts shown herewith (Figs. 1 and 2) of two individuals,—one is a degenerate from the intellectual and physical point of view, the other morally only. The one whose physical conformation is defective is a weak-minded simpleton, who does not show a trace of viciousness; the other individual's conformation is such in every respect that it would be difficult to detect any physical anomaly,



FIG. 2.—FEATURES OF DEGENERATED INDIVIDUAL. (LEGRAIN.)

Deformed physically, and morally an inoffensive simpleton.

La Presse Médicale.

yet he is a perfect moral monster. The value of physical stigmata is thus negated as regards morality. It is the same as regards crime. Even if it be admitted that any other than a conventional definition could be given of crime, it would in any case be necessary to identify it with what is called moral insanity, and Legrain claims that he has demonstrated that moral and physical stigmata have no other relations to one another than that of a common origin.

Charles L. Dana, of New York,⁵⁹ concludes an eloquent discourse on degeneration and its stigmata by the statement that the final work of modernized physiognomy will not be to fix upon

human beings any stigma which marks them as necessarily useless, defective, or dangerous. A type of criminal man, or of the insane man, or epileptic or neurotic man has not been discovered. Such a man bears marks showing simply that he belongs to a somewhat handicapped family. The presence of such marks in an individual will show that he must be especially careful in educating and using his natural power. The discovery of degeneracy throws an additional responsibility upon him, for there are few so bad but that with a proper environment they can get along successfully in life. There may be some born criminals, but they are very few; most are simply persons of degenerate type who fail to husband properly the endowments they possess. We do not excuse the cripple who attempts to become a sprinter, nor should we excuse the morally defective who indulges in debasing habits and low temptations. All modern studies in this direction seem to show that man must be more than ever careful of his education, his training, and his surroundings, and of using all possible moral and spiritual agencies to overcome his defects and make his powers more stable. The future of the degenerate depends enormously upon these factors, and his responsibility lies in his following that line of life which is right for him.

Insanity and Other Diseases.

[One of the most encouraging signs of progress in psychiatry is the increased attention devoted to the relation of somatic diseases to mental disturbances. The following abstracts show that alienists are devoting much consideration to these relations. The observations of Bondurant and Auerbach seem to point decidedly to the conclusion that kidney disease is, in many instances, causative of mental disturbance.—G. H. R.]

According to Reynolds,²_{Sept. 29, '05} it is a comparatively rare occurrence for actual insanity to develop during the course of bodily disease. In general hospitals mental disease most commonly occurs after fevers, poisons, injuries, operations, and heart disease in about this order of frequency, while, in the early stages of fevers and after injuries and operations, mania is the commonest form of insanity. In other conditions depression is more common; but the commonest form is an insanity with marked delusions of persecution (often associated with hallucinations of hearing), such as one sees in phthisis and heart disease and after typhoid fever. There is no form of insanity connected with special bodily disease; so that it is impossible to diagnose the bodily disease from the mental symptoms present except the peculiar state of alcoholic paralysis.

Insanity occurs with unusual frequency in bodily disease associated with peripheral neuritis, as poisoning by alcohol, carbon bisulphide, and lead; pellagra; typhoid, typhus, scarlet, and rheumatic fevers; influenza, pneumonia, phthisis, syphilis, septicaemia, rheumatism, gout, and diabetes. The author suggests that in these conditions the factor which causes the changes in the peripheral nerves might also cause similar changes in the multitudinous internuncial fibres in the brain, and so produce disturbances in the normal cerebral reactions which go to make up a healthy mind.

When the cause is not continuous,—such as the poisons, the fevers, and the traumata,—the mental symptoms in the great majority of cases disappear; in heart disease and phthisis they may disappear and re-appear from time to time, but in some cases, such as insanity connected with gouty kidney, they only disappear with death.

Hepatic System.—Klippel ⁸⁶¹_{Sept., Oct., '94}; ²⁷⁸_{Jan., '95} calls attention to the hepatic element in the production of insanity of alcoholic origin. In a former publication ³⁸⁰_{Aug., Sept., '92} he had already tried to show that the injury to the liver from alcohol might have its effect in causing mental disease. There are few autopsies of insane alcoholics which do not show hepatic alterations, though these may occur in non-insane cases also. This only proves, however, that the predisposition may not always have its full effect. Alcohol introduced into the system has a special tendency to cause lesions of the brain and liver. During the first stage the patient suffers directly from the alcohol, but as these lesions are effected he then becomes, according to the organ altered, a meningitic, a nephritic, or hepatic case. The insanity from alcoholic liver disease is not alcoholic any more than is the paresis from meningo-encephalitis of alcoholic origin; it is purely alcoholic insanity. The individual may have been long abstinent, and yet the liability to insanity exists. The altered hepatic cell, however, has lost its normal antitoxic power.

One feature to which he had before called attention is the habitual lack of ascites in the cirrhotic alterations of the liver in the alcoholic insane. This is a rather remarkable fact. An observation, very fully reported, with elaborate autopsy, is given as illustrating this secondary toxic insanity from hepatic lesions, due primarily to alcoholism.

Urinary System.—E. D. Bondurant ²⁷⁸_{July, '95}; ⁴⁵¹_{Nov.} has examined seventeen hundred cases of insanity admitted during the last four years to the Alabama Insane Hospital, besides chronic cases, chiefly chronic resident at the beginning of this period. At least one careful physical examination and urinalysis has been made, and in

those cases where bodily disease of any importance, real or otherwise, has been noted there have been repeated examinations of the urine. Post-mortem renal lesions have been studied microscopically in more than two hundred cases. Bondurant finds that albumin, together with renal tube-casts, can be detected in the urine of more than one-half the cases of chronic insanity treated in this institution, and in the urine of quite 75 per cent. of the cases of recent insanity admitted. That a large proportion, but not all, of the patients whose renal secretion is thus abnormal exhibit at some time some other evidence of renal disorder. That a smaller percentage—say, 25 per cent.—of those whose urine contains tube-casts and albumin present such clinical evidences of nephritis as would enable any competent practitioner to make the diagnosis of kidney disease or complication without examination of the urine. That 75 per cent. of the kidneys examined post-mortem show pathological changes. Finally, the facts obtained seem to justify the opinion that many of the patients (not all) in whom insanity and nephritis co-exist are insane because of the nephritis,—i.e., the insanity is one of the mental symptoms of acute or chronic uræmic intoxication.

S. Auerbach ²⁸⁵_{1884, B. 1} states that satisfactory clinical observations, together with post-mortem findings, clearly demonstrate the occurrence of pronounced insanity as a result of all forms of kidney inflammation, as well as of other renal disorders. In the great majority of these cases the mental disorder is to be attributed to a uræmic intoxication, and sometimes it is directly equivalent to a uræmic attack. The possibility cannot be excluded, however, that in some cases the renal disease is, like any other severe affection, only the general cause of the psychosis. There is no special form of insanity from renal disease, though the different forms of melancholia are those most frequently observed; those forms associated with systematized delusions seem not to occur. Caution should be the rule in the diagnosis of insanity from kidney disease, as sometimes other causes—marked heredity, and especially organic brain alterations—may amply suffice to explain the disorder. The prognosis is, at least, dubious; it improves if it be possible to employ the proper methods for the treatment of the renal disorder.

C. Beadles ¹⁶⁶_{Jan., 1896} states that, of 150 post-mortem examinations in insanity, he found 106 cases of chronic renal disease, or 70.6 per cent.

C. H. Bond, ²_{Mar. 1, 1896} quoting from Banstead Asylum, finds that of 154 post-mortem cases there were 74 of renal disease, or 48 per cent. Bristowe's figures are 532 post-mortems and 327 cases of chronic renal disease, or 61.466 per cent.

Genital Apparatus.—At a meeting of the German Alienists at Dresden, Naecke, of Hubertsburg, ²¹⁶²₃₈ gave an address on the influence of menstruation on chronic psychoses. The material of his investigation consisted of 99 cases of chronic insanity, mostly from 31 to 45 years of age, generally from 41 to 45; 3.44 per cent. were hereditarily directly and indirectly affected, 11 were very unruly, 17 unruly, 71 occasionally unruly, 17 suffered from paranoia, 40 from paranoia with imbecility, 23 from secondary mental disturbance with hallucinations, 10 from secondary imbecility apparently succeeding to mania or melancholia, 7 from idiocy and higher imbecility, and 2 from periodical mania. Both the periods and the intervals between the periods were, on the whole, regular, as when any irregularity occurred the patient was generally over 35, in which age also the menses were freer. The climacteric appeared, on the whole, to set in earlier than usual. The symptoms accompanying the menses were not more frequent than in healthy women. Menstruation had a certain influence, almost certainly in 16 or 18 cases, questionably in 16, generally in the form of motor and psychical unrest, more delusions, congestion, rarely more hallucinations. Erotism was rare. The influence of the menses is therefore far less in chronic than in acute psychoses.

He concludes that both menstruation and altered psychical activity are co-effects of an unknown cause. The menstrual period seems to exert an actual direct influence upon psychoses, only or principally in those cases when pain arising from some genital trouble reacts on the system.

In a paper on gynecological disorders and their relation to insanity Clara Barrus ²⁷⁸_{Apr., '96} gives a table of one hundred cases examined in the Middletown State Hospital, N. Y., during the past year, the conditions being those noted at the time of the examination, before any treatment was given.

A perusal of the table convinces one of the truth of Morel's statement that, although the brain is always the seat of insanity, it is not always the seat of its cause. The author does not claim, however, that insanity in all the cases here reported is of reflex origin. Seventeen of the cases showed distinct post-climacteric atrophy; 9, enlarged uterine cavities; 12, enlarged cervixes; 43, erosions of varying degrees of severity, from slight irritations and abrasions about the os to severe granular erosions; 7, lacerated cervixes, one having been repaired before admission; 8, unsymmetrical cervixes; 4, relaxed, atonic uteri; 17, retroversion; 3, anteversion; 7, lateroversion; 8, normal uteri; 3, old adhesions around cervix; 3, cases of pin-head os; 2, cervix and vagina

anæmic; 1, cervix and vagina cyanotic; 3, vaginitis; 1, proclivencia; 1, juvenile uterus.

(See "Genito-Urinary Diseases in the Female," section F, in this volume.)

Basedow's Disease.—A. Maude ²_{Sept. 23, '96} read a paper on mental symptoms in relation to exophthalmic goitre in which he contended that there was a very definite form of mental change, only lacking in one of his twenty cases, characterized by extreme motor restlessness, extreme insomnia, and occasional sensorial illusions of sight or hearing, but it is doubtful whether some cases of auditory illusions are not dependent on Eustachian catarrh, which Maude has found common in Graves's disease. He found that the more peculiarly psychological changes were irritability, incapacity for mental application, loss of memory, and untruthfulness, and Russell Reynolds has described a condition quite common as "chorea of idea." Another common condition is a morbid sense of duty akin to religious melancholia, but not accompanied by definite melancholia. If definite alienation, which occurred in only one case of the author's twenty, does take place, the commonest form is melancholia; delusions of persecution are also frequently seen. Mania occurring in the course of exophthalmic goitre is of bad augury.

Raynaud's Disease.—J. G. Kiernan, of Chicago, ¹³⁹_{Nov., '94} ²⁷⁸_{Jan., '95} calls attention to the co-existence of the phenomena of Raynaud's disease with insanity, and recalls a former article of his own ²⁴²_{Apr., '78} in which he pointed out that these phenomena occurred in hebephrenial stupor, in stuporous insanity, in melancholia attonita, in katatonia, and in certain cases of paretic dementia. He had also called attention to a marbling of the extremities and to a gangrenous condition of the same, as a result of paretic dementia. He now states that in nearly all the stuporous states, whether the stupor be that of stuporous insanity or resulting from absorption in a delusion, as in paranoia or melancholia, or occurring hebephrenia, or katatonia, or stuporous epilepsy, or paretic dementia, manifestations of the Raynaud disease type occur. The pain, due to the disease, felt by melancholic, paranoiac, hebephrenic, paretic dement, or epileptic, forms the basis of a persecutory (electric, witchcraft) element in a delusion. The disease is exceedingly frequent in the stupor which sometimes succeeds cases of acute mania. In four of such cases which came under his observation in the Cook County Insane Hospital, and in ten observed at the New York City Asylum for the Insane, the condition on the feet proceeded to gangrene, and when the patients recovered, as they all did, one or more toes were injured. In such cases

amyl-nitrite by the nose and quebracho hypodermatic injections proved useful. The condition disappears on recovery, but in certain cases may lead to blood poisoning secondary to gangrene.

General Visceral Diseases.—In an article on some mental states associated with visceral disease in the sane Henry Head states ^{Sept. 12, '96} that on classifying 169 cases of visceral disease, of which he has complete and careful notes, he finds that 87 cases suffered at one time or another from referred pain associated with superficial tenderness. Of these 87 cases 60 showed typical depression, 31 had hallucinations during their stay in the hospital, 19 gave a history of hallucinations before admission, and 32 showed the delusion of suspicion. Of the 82 cases without referred pain or tenderness none showed the depression and none had hallucinations during their stay in hospital; 3 gave a history of hallucinations before admission; none showed the delusion of suspicion.

The mental disturbances seem to stand in direct relation to the intensity of the pain and tenderness, for if from the first group (87) are subtracted 17 cases in which the scalp-tenderness only occurred once during their stay in hospital and 8 in whom tenderness was present on the body, only 62 cases remain in which the disturbance of sensation was well marked. Of these 62 cases 59 showed the typical depression and 3 were doubtful; 31 had hallucinations in hospital and 15 gave a history of hallucinations before admission; 32 showed the delusion of suspicion and 3 were doubtful. On the other hand, of the 17 cases who only showed scalp-tenderness once during their stay in hospital 1 showed the depression, none had hallucinations, 3 gave a history of hallucinations, and none showed the delusion of suspicion. Of the 8 who exhibited tenderness of the body only, none showed the depression, none had hallucinations, 1 gave a history of hallucinations, and none showed the delusion of suspicion.

Local pain, whether associated with deep tenderness or not, is not associated with these mental changes. Eight cases of pleural pain showed none of the above-mentioned mental changes. One case passed through a pleurisy without mental change, but some weeks after developed the typical mental changes in association with definite referred pain—not local, like the pleural pain—accompanied by superficial tenderness—not deep tenderness, as with the pleurisy—caused by the implication of the lung itself by the tuberculous disease. In the same way the local pain of peritonitis causes none of the mental changes described above.

The depression seems to be associated mainly with the presence of areas over the lower part of the chest and over the abdomen.

The hallucinations are only present where scalp-tenderness is a marked feature of the sensory disturbance.

General Paresis.

[The numerous observations upon general paresis, both clinical and pathological, show the wide-spread interest in this disease. While nothing new is to be noted in the pathology of the affection, the investigations into its etiology point clearly to its close relations with syphilis.—G. H. R.]

Pathology.—The *New York Medical Record*, ⁵⁹_{Jan 1, '96} commenting upon a paper by T. S. Clouston, who called attention to the great increase of general paralysis in England and Scotland, states that the asylum statistics of the United States show an even greater increase. In a single asylum of New York State, for example, that at Ogdensburg, there were among the 659 admissions 31 cases of general paresis. This would make the proportion of general paralysis over 4 per cent.

Among seven State asylums, to which 1942 patients were admitted in 1890, there were 66 cases of general paralysis, or a little over 3 per cent. If 4 per cent. be the general ratio for this disease in the State of New York, then the total number of paretics among the 16,000 insane would be about 640. As a matter of fact the number is much greater, because the proportion of this disease is larger in the New York and Kings County Asylums than in those of the State at large. But even if there were but 4000 cases of general paresis among the 100,000 insane of the United States, it would be an extraordinary evidence of the development of a disease which in the last century was certainly not known, even if it did exist.

Louis C. Pettit, ⁵⁹_{July 6, '96} commenting on the above statement, remarks that the recognition of paresis has apparently taken place rather abruptly since the year 1873; previous to that time "ramollissement," "periencephalitis," etc., obscure and bewilder occasional accurate diagnosis so as to make statistics unreliable, and that for the past twenty years there seems to have been an almost mechanical uniformity in ratio between paresis and all other forms of insanity. The author states that from 1875 to 1895 the number of cases of paresis (diagnosed at death) was as follows:—

1875 to 1880, total deaths,	658;	paretics,	215, or 32 per cent.
1880 to 1885, " "	861;	" "	314, or 36 "
1885 to 1890, " "	1140;	" "	397, or 34 "
1890 to 1891, " "	233;	" "	78, or 32 "
1891 to 1892, " "	290;	" "	87, or 30 "
1892 to 1893, " "	293;	" "	92, or 32 "
1893 to 1894, " "	263;	" "	88, or 33 "
1894 to 1895, " "	287;	" "	95, or 33 "

This gives a total of 4025 deaths, 1366 cases of paresis, or about 33 per cent. of deaths from all forms of insanity.

Of the admissions, the past five years show the same uniform progress. In 4628 male admissions there were 705 cases of paresis, or about 15 per cent. The death-records of this disease reveal a remarkable range in duration, the maximum being 35 years; the oldest person at death, 79; the youngest, 22. The number of syphilitics, 185. Socially the married are to the single as three to one; to the widowed, as twelve to one; while the divorced stand as one man.

Klippel and Serieux⁹⁴ ^{Nov., '94}; ² ^{Dec. 15, '94} give the results of analyses of the urine of patients in the second stage of general paralysis. In most of their cases there was slight polyuria; the urine was pale, feebly acid, of low specific gravity, and contained excess of mucus. As a rule, urea was below the normal, sometimes much below. Uric acid varied much: occasionally it was augmented; when diminished it still was abnormally high in proportion to the urea. Phosphoric acid was always reduced in amount, the decrease being greater than that of the urea; most often the earthy phosphates exceeded the alkaline. The chlorides were nearly always considerably increased. Albumin was relatively frequent, but never in large amount. Acetone was tested for ten times and only once was absent. Control analyses of six normal urines showed the presence of acetone in four. Indican often was found in notable quantity. Peptones were discovered in three of five analyses.

As is generally agreed, the agents inducing general paralysis of the insane are sexual excesses, syphilis, and alcoholism, with, perhaps, strain of mind superadded. Drapes,¹⁰⁶ ^{Oct., '94} in calling attention to the comparative immunity of the Irish insane from the disease, and its frequency in the English, states that this fact would confute the theory that alcoholism alone is sufficient to cause the disease. In Ireland there is an abundance of alcoholism and a large number of cases of insanity due to it, but scarcely any general paralysis. On the other hand, syphilis is a comparatively rare disease amongst the rural population of Ireland, whereas it is common enough in the numerous large towns and cities of England, where general paralysis is frequent.

Bannister⁹⁹ ^{Jan. 27, '96} believes, from the present trend of opinion, that the view that paresis is in almost every instance, if not in all, a result of syphilis, will become before long the prevailing one. A review of statistics and data of a dozen authorities mentioned in this article show syphilis in from 75 to 95 per cent. of cases. The facts that paresis can be indisputably caused from comparatively recent syphilis, and that this is in all respects indis-

tinguishable from the usual type, are now generally recognized, which facts support the view of the generally syphilitic character of the disease.

Emil Houghberg¹⁴⁷_{Oct., '96} reports in detail the history of 100 cases of general paralysis, observed at the insane asylum at Lappvik, near Helsingfors, Finland. Of 1451 cases treated at the institution in the course of seventeen years, 100 were paretics (91 men and 9 women); 74 per cent. of these patients gave a certain history of syphilis; in 12 per cent. other forms of venereal disease were present. In only 14 per cent. did the history fail to give information on this point; even in these cases one could not with certainty exclude specific infection. In the majority of the cases syphilis had been acquired between the eighteenth and thirty-second year, and the general paralysis appears to have developed from five to fifteen years after the luetic infection. Among the 1351 insane, who were not suffering from general paralysis, only 4.28 per cent. showed a previous history of syphilis. While many of the male general paretics belonged to the better classes, none of the women belonged to these classes of society. In nearly all the cases the previous luetic symptoms had been of a mild form. Besides lues the author found some other etiological factors, as follow: In 21 cases, heredity; in 13 cases, psychical disturbance; in 10, excessive indulgence in liquor, and in 3, trauma; 82.9 per cent. of the general paralytics died inside of four years, while in 43.6 per cent. the duration of the disease did not exceed two years. The course of the disease was, as a rule, progressive; only in three cases did the writer meet with temporary remissions of the disease. Antiluetic treatment did not seem to have any effect upon the course of the disease. Post-mortem examinations did not reveal any recognizable specific syphilitic changes. The author concludes that syphilis is a factor of great etiological importance in general paralysis.

Raymond, of Paris,²⁷⁸_{Oct., '94} concludes, from the histories of three closely studied cases, that in general paresis of syphilitic origin the lesion is primarily vascular, affecting especially the arterioles and capillaries. If the lesion does not progress to such an extent as to impair the nutrition of the nerve-cells no cerebral symptoms may be noticed, but when they degenerate symptoms of general paresis make their appearance. He gives account of two other cases in which subjects of syphilis have shown symptoms calculated to excite suspicion of general paresis, in one case for six and in the other for fifteen years, without progress of the malady.

In discussing the relation between syphilis and general paralysis before the Académie de Médecine Fournier³⁶⁰_{Dec., '94} gave the

name of "pseudo-general paralysis" to a form of cerebral syphilis presenting appearances almost exactly the same as those of true general paralysis, just as certain other forms of syphilis resemble epilepsy or aphasia. He considers it an undoubted fact that syphilis is a potent factor in general paralysis,—a fact proven by the frequency of a syphilitic family history (50 to 92 per cent., according to statistics); by the number of syphilitics who develop general paralysis; by the rarity of general paralysis among women, except among those who have led irregular lives; by its rarity in the country and among ministers and persons belonging to religious orders; by the relative frequency of syphilitic antecedents in general paralysis as compared with other forms of insanity; by the association of general paralysis with tabes, in which syphilis is now accepted as an etiological factor; by the occurrence of general paralysis in young persons with syphilitic antecedents and in whom the disease could not be ascribed to excesses, immorality, or inebriety.

While convinced that a great many cases of general paralysis proceed from syphilis, and would have never developed had the patients not contracted syphilis, Fournier does not agree with the opinion expressed by some authors, that general paralysis is a direct consequence of syphilis,—a simple specific symptom, such as a gumma, a mucous patch, or a chancre,—for one reason, among many others, that general paralysis is not influenced by mercury or iodine. He is inclined to class the disease among the parasymphilitic cases, which, though incontestably of syphilitic origin, are not syphilitic in themselves and do not necessarily and exclusively depend upon syphilis as the cause. Such are tabes, hysteria, hydrocephalus, etc.

The question as to whether true general paralysis following syphilis can be differentiated by any clinical, anatomical, or other symptom from paralysis due to other causes is one which Fournier does not attempt to answer in his rôle of simply syphiligraphist, as he believes it to be a question that can only be answered by the collaboration of alienists, anatomo-pathologists, and syphiligraphists. He has been struck with the fact that the general paralysis of syphilitic patients sometimes begins with symptoms of tabes, forming a sort of hybrid combination which he has designated as cerebro-spinal tabes. He has seen tabes frequently turn into general paralysis and the reverse, or the two diseases developing together; but he cannot affirm positively that such a combination of symptoms is not met with outside of syphilitic cases, though he believes that it is not.

Hirschl² Nov. 20, '96 argues that paralysis of the insane is a manifesta-

tion of the third stage of syphilis. In the reports of two hundred cases he finds the other etiological factors hitherto accepted wholly insignificant; on the contrary, syphilis had preceded in a larger percentage of cases than even in patients attending Lang's clinic suffering from gummatous processes in different parts of the body. As to the inefficaciousness of antisyphilitic treatment, Hirschl points out that gummata can only be replaced by cicatricial tissue. A man with post-gummatous scars on his arm may still be looked at as generally healthy; defects in his brain-cortex, though filled up by connective tissue, make him paralytic in a remission. Hirschl sees nothing in microscopical changes that could not be taken as an effect of syphilis, the whole affection being, then, one of syphilitic encephalitis, ending in cerebro-syphilitic atrophy.

In twelve cases carefully examined histologically Alfred W. Campbell⁸²⁴_{V.S.P. 66, 74} found neuritis of the vagus more marked and more constantly present than in any other nerve. The mixed spinal nerves showed distinct proof of parenchymatous and interstitial neuritis more marked near their terminations (toward the extremities) than in the trunks. This fact corroborates Goodall, and his observation of the constant blocking of the smaller arteries of the nerves and of the great preponderance of small nerve-fibres in the inflamed and atrophied nerves is also confirmed by Campbell. The author considers the small nerve-fibres as reversion to the embryonic type. The vascular blocking, which is not confined to the nerves of general paretics, though not syphilitic, is yet obscure. The anterior spinal roots were also found diseased, and the cranial nerves showed some interstitial neuritis. The nuclei of origin of the cranial nerves and the nerve-cells of the spinal cord showed some atrophy, pigmentation, etc., but in no case was this central disease sufficient to explain the extent of disease in the nerve-trunks. The muscles examined gave evidence of fatty degeneration, atrophy, and proliferation of the nuclei, of the sarcolemma, and connective tissue. Campbell suggests that, as in diphtheritic, alcoholic, and some other forms of neuritis, the cause of the practically universal neuritis in general paralysis is toxic, the special toxin being as yet wholly undetermined. This marked neuritis explains the cardiac affections from the conditions of the vagus, the hyperæsthesia and subsequent anæsthesia in the limbs, and other symptoms.

Symptomatology.—Reginald Farrar,¹⁸⁶_{July, '98} while conceding with Maudsley that the symptoms of general paralysis constitute the most definite and satisfactory example of a clinical variety of mental disease, maintains that neither its symptoms nor its pathology entitle it to be regarded as a distinct disease, and that the term

"general paralysis" cannot reasonably be held to imply more than a congeries of symptoms, due to diffuse interstitial cortical encephalitis, from whatever cause arising.

Marandon de Montyel⁴¹⁰_{July, '96} finds that the cremasteric reflex is altered in 80 per cent. of the cases of general paralysis, being most frequently abolished, exceptionally exaggerated, and rarely only weakened. The alteration is double in 94 per cent., and in three-fourths of the cases from the first stage of the disease; it may therefore be a useful means of diagnosis in doubtful cases. It is, however, of no prognostic value.

Ziehen⁷⁷_{Mar., '96} has found that out of 188 general paralytics the tendo Achillis or ankle-jerk was normal only in 57. An inequality between the two sides was very common. The gradual diminution and disappearance was actually observed. Sometimes the loss of this tendon-reflex was an early symptom. The knee-jerk is not always absent at the same time. Thus in 23 cases the knee-jerk was present, and yet the ankle-jerk was lost on one or both sides. The loss of the ankle-jerk is very uncommon in functional psychoses or neurasthenia, and the author does not believe that it is often absent in health.

According to Cramer,²_{Sept. 1, '94} in 75 per cent. of general paralytics the trunk of the ulnar nerve is not painful on pressure, while in most cases of other forms of insanity compression of the nerve as it lies between the olecranon and the inner condyle produces sharp pain and reaction. The author examined 100 male and 25 female paralytics, and 300 non-paralytic insane persons. In 58 per cent. of the paralytics the ulnar nerve was analgesic; in 35 per cent. pressure caused pain; in 7 per cent. the result was doubtful.

Barich²⁰⁰⁰_{'94} has observed that hallucinations are very frequent. The critical examinations of authorities, the facts of pathological anatomy and physiology, and clinical experience all favor this opinion. The hallucinations due to alcoholism observed in paretics should not be confounded with those of the paresis itself. Those of alcoholic origin are mainly visual and of a painful character; those of the disease, on the contrary, affect all the senses singly or combined and are often of a gay character and in accord with the delusions. The sensory symptoms may be observed in all stages of the disorder, even when dementia is very pronounced. The hallucinations of paretics often pass unperceived, either because of their transient nature or because the demented state of the patient prevents his taking account of his sensations.

Hepburn,²⁷⁸_{Jan., '96} in the examination of eight cases of early paresis,

noted the following appearances: In the earliest period the optic-nerve entrance is creamy pink or leathery, without alteration of vessels; later the discs become whiter and finally take on a bluish tint, with slight cupping and with vascular changes, which are much less marked than in cases of ordinary atrophy. Cutting off of the field of vision on the temporal side is looked upon as a fairly constant symptom, and the rate of its increase as a measure of the progress of the disease.

Kemmler ²¹⁶³_{No. 2, '96} describes a class of cases in which the epileptiform attacks are characterized by a regular rhythmic return of muscular twitchings. These are readily distinguished from the usual clonic spasms in that they occur synchronously with the pulse-rhythm. During these peculiar spasms, which are frequently combined with other features of the so-called paralytic attacks, the body temperature is usually normal or only slightly elevated. Exceptionally it becomes exceedingly high. The twitchings begin on one side, in a circumscribed group of muscles, spread gradually over the entire half of the body, extend then to the other side, to terminate finally in some single muscle-group; or they may return to the first half of the body and end in the group of muscles in which they began. Along with this chief type two variations were noticed. In one the twitchings were confined to the single group of muscles in which they started; in the other the entire body was involved from the beginning.

Legrain ⁹⁴_{Feb., '96} ²¹³_{Mar., '96} contends that congestion of the nervous centres is an insufficient explanation of epileptiform seizures, and endeavors to supply a probable hypothesis by assuming a urotoxæmia; he claims that those paretics who are free from these attacks are those only who retain to the last the full functional activity of the kidneys. On these grounds he maintains that parietic dementia is not exclusively a disease of the brain and nervous system, but that its lesions are also to be sought in the viscera, and in the arterio-sclerosis which forms their common bond. He draws, moreover, a practical conclusion from these views, that free abstraction of blood by leeching is a useful therapeutic measure, relieving the system of the toxic products that are overwhelming the brain; and claims to have had practical demonstration of this fact.

Juvenile Paresis.—Alzheimer, of Frankfort-on-the-Main, has collected ⁷⁵_{Oct. 15, '94} ²⁷⁸_{Jan., '96} in the literature some 40 cases of juvenile paresis. In these the influence of syphilis is more marked even than in the adult; out of 35 cases which afforded some statements as to this, the dependent prior syphilis was pronounced in 27, and in the other cases it was at least probable. All

were hereditary syphilis except 4. Only 2 cases were found in which traumatism was considered the cause. In 27 out of 35 there was a pronounced morbid heredity, showing a predominance of this in the adult. In several cases the paresis was preceded by other psychical abnormalities. Both sexes seemed equally represented. The paresis generally appeared between the ages of 10 and 16, and in most the bodily development was deficient. The duration averaged four years. Symptomatically the course is generally that of a progressive dementia without delusions, but these were not invariably wanting. Apoplectiform attacks and hemiplegia were the rule; in all other respects the symptoms were the same as in the adult, as were also the post-mortem findings.

Regis, of Bordeaux, ⁸_{p.220,'96} ⁸¹⁴_{Aug.1,'96} has found that, of 42 cases of juvenile general paralysis which have so far been reported, the history of the patient is known in 37, and of these 37 syphilis was unquestionable in 29 and probable in 8. In every case, consequently, the general paralysis was preceded by syphilis, which, as a rule, was hereditary, and only in a few cases acquired,—a fact which appears to prove that juvenile general paralysis is almost invariably the result of hereditary (or sometimes acquired) syphilis, just as general paralysis in adults is, in the immense majority, due to acquired syphilis. Neuropathic heredity, which is a very active element in the etiology of general paralysis, is never more than a predisposing cause, and requires, for being brought into action, an exciting cause of some kind.

Bresler ⁷⁵_{Dec,'96} points out that the recorded cases are mostly in girls. In a case reported by him because of the absence of bulbar symptoms—that is, of difficulty in articulation and of ideas of grandeur—syphilis could not be excluded, and there were some appearances in the liver post-mortem which seemed to point to it.

Thompson and Dawson ⁶_{Feb.16,'96} ⁹_{Mar.20,'96} have reported a case of general paralysis in a girl in which post-mortem examination disclosed the existence of typical lesions. The outer and inner tables of the calvarium were thickened, and the dura mater was thickened and adherent in places, especially along the superior longitudinal sinus, while in other places it was separated from the bone by false membrane. The cerebral aspect of the dura likewise was lined with false membrane of varying thickness, and which was loosely adherent to the arachnoid. There was an excess of sub-arachnoid fluid, and the pia was universally adherent to the cortex, and an abnormal attachment between the anterior lobes of the brain, just in front of the genu of the corpus callosum. Superficial atrophy of the brain was evident and most pronounced in the

frontal and parietal regions. On section, the cortex was atrophied and toughened. The white matter was pinkish in color and, though of soft consistence, was also tough. The ganglia was soft and friable. The ventricles were dilated and contained turbid fluid, while the ependyma was thickened and tougher than normal. Granulations were found in the pia, especially along the vessels and also on the floors of the lateral ventricles and of the fourth ventricle as well. The soft commissure of the third ventricle was exceedingly tough. The cerebellum presented much the same conditions as the cerebrum. Microscopical examination of the brain and cord confirmed the existence of degenerative changes.

A case of general paralysis occurring in a girl 9½ years of age is recorded by E. L. Dunn, of the Berks County Asylum, Eng. ¹⁸⁶_{July, '96}. It terminated fatally in about sixteen months without intercurrent disease.

Treatment.—Marro and Ruata ⁹⁶_{v. 16, p. 94, '96} presented before the Royal Academy of Medicine, in Turin, a man and a woman who had been treated for progressive paralysis, one having been cured some three years and the other for one year. The treatment consisted in causing subcutaneous abscesses on the back along the spinal column by means of cantharidate-of-potassium injections in the man, and essential oil of turpentine in the woman. In the discussion Lombroso thought the recovery due to the general febrile state induced by the injections rather than to the formation of abscesses. He recollected having seen several recoveries from progressive paralysis after the occurrence of small-pox, and said that he had once artificially caused small-pox in a patient in which recovery followed.

In the infantile form A. W. Wilmarth ⁶¹_{No. 34, '94} considers that the best possible hygienic conditions should be obtained, and the child should be at once removed from all excitement and worry and should be prohibited from all mental work. Regulation of diet is of the greatest importance. The author regards iodide of iron and iodide of potassium as among the most valuable remedies. The preparations of arsenic are less efficacious. Bromides are sometimes valuable in small doses; in large doses they mask the symptoms of the disease and seriously disturb the digestion.

Melancholia.

George Dumas, ^{2164 1006}_{'96; July, '96} in a study on the intellectual state in melancholia, expresses the opinion that cases of melancholia are generally traceable to two causes,—first and most frequently to a general (but unknown) somatic condition which manifests itself as an affective state in consciousness and about which the ideas

are associated in a secondary way, and second and less often to a fixed idea, or obsession, which occasions the affective state, about which in turn the other intellectual states are secondarily associated.

Both in melancholia and in abulia these associated ideas obey always one law,—the law of synthesis. The patient being unable to give a valid account for his depression, which is nevertheless a fact of real experience, finds himself under the necessity of inventing reasons for it. It is this which shapes the whole mental life of the patient.

Looking for the cause of melancholia to profound and widespread organic changes, we find here an explanation for the general psychical relaxation so characteristic of melancholia. The increase of the inhibitory phenomena and the resultant abulia may be traced to the same cause. The invasion of consciousness affects all of the mental faculties, but not to the same extent. The synthetic activities are weakened with the others, but not so much; so that the law of synthesis referred to above fills the whole field of consciousness and dominates all else.

Accepting the Lange-James theory of the somatic origin of emotion as probably true, the author erects upon it a theory for the etiology of melancholia. Cases belonging to the first category (of somatic origin) are the expression of a cachexia, which is usually found to be a sequela of some one of the infectious fevers, though other origins are also common. Melancholia of the second type (of intellectual origin) is explained in a similar way. An idea or a mental shock may act upon the body (*via* the circulatory system, as suggested by Meynert's theory of emotion) in such a way as to produce a psychical depression essentially similar to that found in the cases of the first type. From this, as before, arises not melancholia, but a melancholic condition.

It follows, then, that melancholia has no existence as a mental entity, but may be resolved into sensory processes, on the one hand; on the other hand, into phenomena of arrest.

Hiram Elliott⁵⁹ holds that abnormal action of the vasomotor nerves governing the muscular tension of the cerebral vessels may produce irregularity of the blood-supply to the various brain-areas, thus interfering with normal nutrition and functionation. In corroboration of this theory, he cites the evidences of prolonged congestion of certain cerebral areas found on post-mortem examination of persons who suffered long from melancholia which terminated in dementia. He emphasizes the following facts: (1) simple melancholia is a very common condition, (2) if treated early and properly it is a very curable one, and (3) it is

out of this unfortunate class that suicide claims probably a majority of its victims.

Neil ¹⁶⁶_{Jan. 76} presents a record of three cases in which recovery took place after eleven, nine and a half, and seven years, respectively. All three presented symptoms usually considered of bad omen. In one the duration of the disorder on admission was three years, and for three more years the condition continued to get worse. In two there were vivid and fixed delusions for several years and in one there were automatic movements and wet and dirty habits for years. Recovery, which in each was complete, took place in the absence of any special mode of treatment.

From a study of thirty-five cases Whitmore Steele ⁵⁹_{May 25, 76} concludes that in melancholia, acute and chronic, there is a marked deficiency in the number of hæmocytes, and that the percentage of hæmoglobin is reduced in like proportion. A number of the cases showing crenation of the hæmocytes at first are found much less crenated after tonic treatment. Although melancholia may not be caused by impoverished blood *per se*, this condition almost invariably exists, and in a large majority of cases improvement of the mental symptoms is co-incident with improvement in the general health and in the quality of the blood, by means of tonics,—iron, etc.

Treatment.—Preston ⁴⁰_{Feb. 76} analyzed the blood of twelve patients and found that in acute or chronic melancholia there is a marked diminution of the number of globules; in very few cases the percentage approached the normal. Hæmoglobin was reduced in the same proportion. A number of cases show considerable curvation of the globules, becoming less marked after a tonic course. Systematic tonic treatment is very efficacious in the treatment of this form of insanity. The administration of iron alone, or combined with quinine and strychnine, seemed to answer best. It showed that, although melancholia cannot be produced by poverty of blood, yet the latter is always associated with the former and the improvement in the symptoms coincides with the improvement in the general health and quality of the blood.

Frank Halleck Stevenson, of Syracuse, N. Y., ¹_{July 27, 76} in an article on melancholia with histories of three cases, suggests that, in asylums where the patients are often detained against their will, associating only with lunatics of various degrees of intelligence and refinement, convalescence is often delayed. He, therefore, advocates treating all such cases at home, under the care of a competent physician and a nurse in whom implicit confidence can be placed, where our patients will do themselves and others no harm.

Blandford, of London, ⁶_{Aug. 1, '76} expressed a strong opinion against the hap-hazard way in which patients suffering from melancholia are sent on sea-voyages,—more especially by those who have never been on a sea-voyage themselves,—and pointed out the almost tempting allurements to suicide which such a voyage would offer. Norman Kerr alluded to the frequency with which alcoholic indulgence was found in the subjects of melancholia; but he attached much importance to finding the proper food for the individual, and mentioned the case of an old gentleman of 85, without any alcoholic habit, who was always cured of his recurrent attacks of melancholia by the administration of peptonized milk. Batty Tuke expressed his belief in the efficacy of rest in bed in these cases, and was of opinion that the morbid state of the nerve-cell was not necessarily primary, but might be secondary to a disordered vascular condition.

Paranoia.

In a case of paranoia, with a study of the cerebral convolutions, Henry J. Berkley, of Baltimore, ⁷⁶⁴_{Dec. '76} noticed, in the right hemisphere and in the region of the post-central furrow, a very broken arrangement of the gyri of the parietal region, an unusual development of the third frontal convolution, which was short, broad, and standing isolated from the other convolutions of the lobe except on its orbital aspect. The external aspect of the left hemisphere was much more in conformity to recognized types, but the inner surface had many points of dissimilarity with the opposite brain-half. Altogether the impression given by both hemispheres was considerably at variance with the usual types of convolutional development and the asymmetry between the hemispheres was very marked.

Bernhard Feist ²⁰_{Aug. 1891, H. J.} states that investigation of the central nervous system in four cases of chronic paranoia revealed degeneration of the posterior cords of the spinal marrow. The supporting tissue of the cord was diffusely proliferated and reticulated. The author therefore concludes that it is probable that these alterations of the spinal cord are in direct, though obscure, relation with the psychical troubles which are observed in patients suffering from paranoia.

G. Ballet and Arnaud, of Paris, ⁸⁶¹_{Mar. Apr. '76} describe a case of systematic delirium of grandeur without any noticeable lowering of the intellect in a patient over 80 years of age.

Ushenko ⁹⁸⁵_{v. 1, '76} reports a case of periodical paranoia, the characteristics of which were (1) the alternation of the attacks with intervals of lucidity; (2) the resemblance of the attacks between

each other. . There was only a short premonitory period to the attack, and the whole personality became changed at the time of the disease.

The author comes to the conclusion that periodical paranoia belongs to the psychoses of the degenerated, and characteristic of these psychoses is that, no matter how frequently they may occur in an individual, they seldom lead to dementia.

In a paper on the paranoiac as a menace to society, C. B. Burr, of Flint, Mich., ¹¹⁷⁰_{Nov., '96} pointed to the numerous recent murders of prominent persons by so-called "cranks." What to do with these persons is one of the problems confronting our modern civilization, and is one demanding an answer from students of the subject. While the harmless lunatics are kept in confinement, dangerous paranoiacs are allowed their liberty. The author contends that the paranoiac is a menace to society and should be sequestered, but he fears that the public will continue to view with indifference or approval, now and then, the execution of a criminally insane person as "sane enough to hang," and vainly hope for a deterrent effect of this example upon other deluded minds.

Idiocy.

Wulff ¹⁶⁶_{Jan., '96} studied the comparative smallness and weakness of the heart peculiar to idiots, in one hundred and twenty-three cases, and states, as a result of his investigations, that these conditions are general, and not the result of atrophy or degeneration following disease. With idiots the brain is also, in proportion to the weight and height, smaller than in sane people, but the diminution of the heart does not go parallel with the diminution of the brain. The diminished size of the heart is greater in proportion than the diminished size of the brain; hence Wulff supposes that in some cases, although the blood-supply may be sufficient to afford nourishment to the brain so as to enable it to grow to a certain size, the heart does not send enough for the development of the finer nerve-elements or for the excitement and maintenance of normal mental activity.

Klinke ³⁶⁸_{Dec., '94} employed Vulpius's method of studying the cortex of the normal brain by counting the tangential fibres in the examination of 12 diseased brains. Seven of these were cases of idiocy, 2 of senile dementia, 2 of simple insanity, and 1 of general paralysis. The principal conclusions given by Klinke are: general disorders of nutrition, such as are observed in idiots and after early epileptic attacks, keep back the development of the tangential fibres. The number of the fibres is somewhat diminished in

age, but much more so in dementia senilis. In dementia paralytica the number of the fibres can be smaller than with some idiots. The diminution in the fibres in idiots' brains is dependent upon the age in which the injury to nutrition took place. The average number of fibres is not the same in different portions of the brain. They are most numerous in the median convolution of the right hemisphere and next in number in the right occipital lobe. The frontal lobe is most affected by a diminution in the number of the fibres, and the outer tangential fibres suffer most.

F. Savary Pearce, of Philadelphia, ¹¹⁸¹_{June, '96} sums up the cellular pathology of idiocy as follows: The nerve-cells are round, not pyramidal; the nucleus (round or oval) is in the centre with retracted protoplasm around it, thus leaving here a clear space or faintly-stained granular substance. Only occasionally are the nuclei at the base of a cell; at times the nucleus is at the apex of the nerve-cell. The nerve-cells have few processes, and these are small and stunted. The apical process is nearly always present. Now and then processes exist, but no spaces can be found. When sections are hardened, there is often a curious honey-comb condition noted, due to the number of cells, with spaces, seen in the field. In frozen sections there are to be seen no clear spaces. The nucleus stains deeply, the protoplasm less so. The apical process of the nerve-cells is always seen, and the cells are less stunted as in hardened sections. In either method of examining the cortex not more than five layers are detected, and the third layer is most affected.

The influence of heredity upon idiocy was studied by Martin W. Barr, of Elwyn, Pa. ²¹²_{June, '96} In his own experience, based upon a careful examination into the family history of 1044 idiots, he found 397 families, or 38 per cent., with a history of insanity or imbecility, and 225, or about 21½ per cent., of various neuroses. The author states that, while consanguinity is commonly accounted a fruitful cause of idiocy, comparative investigation shows, first, that children having both mental and physical defects are the offspring of healthy unrelated parents; second, that perfectly developed children with no personal peculiarities whatsoever may be the issue of consanguineous marriages. This would lead us to accept the statement that consanguinity has but little, if any, influence in the production of idiocy unless there be some hereditary neurosis. He quotes Heath, who maintains that if the blood be pure and uncontaminated there will be no bad results from such marriages.

In support of his views Barr states that in 1865 the population of Batz, Brittany, numbered 3300; 5 marriages took place

between first cousins, 31 between second cousins, and 10 between those of third degree. The issue of the first cousins was 23 children free from all disease, both mental and physical. The second cousins had 120 children, normal in every respect, and the issue of the cousins of the third degree was 29 children, also perfect. Two women were sterile. But insanity, idiocy, and nervous diseases were unknown in this community. Kerlin found but 7 per cent. of his cases examined directly traceable to consanguinity. Barr, in his own examination of 1044 idiots, found but $3\frac{1}{2}$ per cent.

Prognosis and Treatment.—With regard to prognosis, Fletcher Beach, of London, ¹⁵_{July, '96} observes that congenital cases of low type can be considerably improved, while those of a high type not only acquire a respectable amount of knowledge, but are capable of being taught employments of various kinds and of making themselves useful. Cases of the cretinoid type can be ameliorated by treatment, but the same cannot be said of those suffering from hydrocephalus. As to non-congenital cases, the prognosis will vary considerably with the cause of the disease. Those whose condition is due to convulsions in early life do not improve much, nor do those who suffer from chronic hypertrophy of the brain. On the other hand, those who suffer from epilepsy and paralysis, or in whom the mental affection has come on as the result of a blow on the head, or after fevers, measles, and whooping-cough, often make marked improvement. Very bright-looking children are frequently very disappointing; they are so volatile and constantly on the move that their attention cannot be gained, while the phlegmatic, dull-looking patient will take an interest in his work and make considerable progress. (See "Surgery of the Brain," section A, vol. iii.)

Hysteria.

J. Crossley Wright ²_{Dec. 28, '96} gave an account of an epidemic of hysteria which took place in a girls' school in England. It consisted of fourteen cases, the ages of the patients varying between 11 and 14 years. In the majority one type was distinguishable,—namely, clonic rhythmical spasm of the upper limbs, varying in intensity between a fine tremor and coarse, violent movements involving the whole of the trunk. In some of the cases the elbow-joint was rigidly extended, the fingers being flexed firmly into the palm, while the chief motion was at the shoulder-joint, giving rise to forcible alternate adduction and abduction, as well as internal rotation of the whole limb. In two cases there was a distinct hammering action of the clenched fist against the side, table, or

against any surface with which it was placed in contact. In a single instance there was spasm of the eyelids, with an occasional quick opening and shutting. No definite cause for the commencement could be ascertained. The treatment was the same in all the cases,—namely, isolation, rest in bed, milk diet, faradism, a succession of blisters in order to cause pain to the moving part, and, as for drugs, valerian and bromide of potash. That which seemed to have the greatest effect was the blistering, and a marked improvement was at once recognizable after the first one or two blisters had been applied.

Giraudeau,³ points to the frequent co-existence of hysteria and cardiac affections, more frequent in men than in women, especially in those suffering from mitral stenosis, either alone or complicated with insufficiency. Hysterical præcordial pain, hysterical dyspnoea, and hysterical apoplexy should be carefully differentiated from similar symptoms due to cardiac disease.

Ballet, of Paris,¹⁶ discusses the relations between hysteria and the mental state of an individual who is not in possession of his full intellectual, moral, and affective powers. The prevailing opinion at present is that hysteria is a mental disorder. Its symptoms are psychical, having as their origin certain too forcible mental representations, or association of ideas too facile and active. In a psychological point of view the elementary disturbance in hysteria should be considered as a disaggregation of the mental elements, with restriction or narrowing of consciousness, but with retention of subconscious and automatic functions; hence a restricted personality, mobile and changeable. The psychical disorders of hysterical persons are not solely due to hysteria; we find them also associated with degeneracy, and then they have heredity for their common origin. Hence the need in these cases to distinguish separately the mental state. In the author's opinion, all forms of insanity may be associated with hysteria.

Joffroy, of Paris, in the discussion, offered the following conclusions:—

1. Hysteria is one of the forms of mental degeneracy.
2. In its limits, hysteria is confused with certain degenerative manifestations, without its being possible to fix between them any definite limits.
3. Clinically, the individuality of hysteria should be preserved as much as possible from the other forms of mental degeneracy.
4. Therefore the term "hysterical" should be applied only to the phenomena of the complete or partial attack or to manifestations that are clearly hysterical, like spontaneous somnambulism, or to those directly connected with hysteria.

Souques ⁹⁴_{Dec., '94}; ²_{May 11, '96} reports a case to illustrate the part played by fixed ideas in the pathogenesis of hysterical polyuria. The urine amounted to about twenty litres (quarts) in the twenty-four hours and was free from sugar and albumin. Treatment by hypnosis and suggestion was commenced. Diminution of the urinary excretion at once resulted, and, after thirteen sittings, the daily quantity was only three or four litres (quarts). The author remarks that, at first, this case might be taken for one of traumatic polyuria, but the existing stigmata of hysteria and the cure of the condition by suggestion plainly establish its hysterical character. While in the somnambulant state the patient related how vividly he had been impressed by the great frequency of micturition that followed his acute excesses. From that impression the author traces the evolution of the fixed idea. The latter, he supposes, is in these cases the starting-point of a cortical reflex that inhibits the renal vasomotor centre, thus inducing vaso-dilatation and augmented blood-pressure in the renal vessels, with consequent hydruria.

Burr ¹¹²_{May, '96} has reported the case of a woman, 40 years old, who, while submitting to an application of a 10-per-cent. solution of cocaine to a sensitive tonsil, suddenly grew pale and lost consciousness, while the breathing became very shallow and the lips cyanosed. The heart was weak and fluttering and the pulse scarcely perceptible. On subsequent examination it was found that the right arm and leg were perfectly analgesic, while the sense of pain was impaired, though not abolished, on the right side of the face. Common sensibility was also impaired in these same regions.

Symptomatology.—Bidon, of Marseilles, ³¹_{Mar., '96} describes two interesting cases occurring in males. According to the author, hysteria occasioned by malaria modifies the symptoms of the latter and constitutes a form of malarial attack of pernicious appearance which is important to recognize. In the first case the patient, while under treatment for syphilis, was attacked by intermittent fever with short intervals between the paroxysms, which were always preceded by an aura and followed by loss of consciousness. On the left flank was an hysterogenetic zone, pressure on which gave rise to a painful laugh with difficult respiration. Under the influence of quinine the attacks of fever progressively diminished in intensity and were not again accompanied by nervous paroxysms. He had never had hysterical seizures apart from an access of fever. The addition of hysterical paroxysms to malarial intoxication constitutes a veritable form of what has been called pernicious association.

The co-existence of hysteria gives, according to Clement, a dramatic effect to the attack, more alarming than dangerous. The symptoms of malarial hysteria are those which ordinarily belong to the neurosis, and their grouping has no peculiar characteristic, exhibiting, in general, a convulsive form, with incomplete attacks and sensory troubles in which hyperæsthesia predominates. Malaria acting upon a weakened nervous system produces an asthenia which favors the development of neuropathies. In most instances the specific poison acts as an irritant to the cerebral cells, either by the simple mechanical influence of contact or by the dissemination and absorption of a toxin.

S. Weir Mitchell, ⁹¹_{Aug. 24, '98} alluding to hysterical contracture, states that two forms exist, as follow:—

1. This concerns single parts and limited groups of muscles, and may last for years without organic change in muscles, joints, or interstitial tissues. In this also sudden cessation of contracture is possible.

2. A form which attacks in succession one limb after another until nearly all voluntary muscles, including those of the trunk, may be affected.

These cases, in the author's opinion, never get well abruptly, and in them muscles, joints, and areolar tissue undergo serious organic changes. In the first form the muscle-reflexes and mechanical and electrical reactions are but little changed, while in the generalized form late in the disease the reflexes are diminished or lost and the quantitative electrical reactions are decreased. It is only in this form, after years of life in bed, that changes in the cord are to be expected, and whether these are independent accidents or secondary products of the hysterical condition is not definitely known.

The Lasègue symptom-complex, which consists in an inability to originate movements of the anæsthetic side without the aid of sight, though they can be continued without this aid, and even with only visual conceptions or touch perception, is discussed in a psychological point of view by S. Landmann. ⁸⁹⁷_{Feb., '98} The following are his conclusions:—

1. The purely hysterical anæsthesia of one-half of the body makes, without the co-operation of sight, the commencement of an ordered movement, but not its continuation, impossible.

2. Anæsthetic arms, the muscles of which have been put into action with the co-operation of sight, are under the same laws as the normal members, inasmuch as their conscious activity is impossible with a conscious-sense activity.

3. With an hysterical anæsthesia, functional disturbances

may occur in the central motor tract, by which the extension of a movement is hindered. This may be in two ways,—either through a mere separation of the motor centre from the subcortical visual centre or through its simultaneous severance from the cortical cells that are requisite for consciousness of the movement.

4. Visual hallucinations in hysterical anæsthesia may replace the absent sensation in their action in suggesting movements to the motor centre; but if there is with the non-anæsthetic side of the patient a normal connection between the consciousness of the movement and the motor centre, the latter will not be thus excited into producing movements by visual hallucinations.

5. Visual perceptions of the anæsthetic side can be replaced by conscious motor representations on the sensitive half of the body.

6. An auditory representation can be separated from the corresponding visual one in an hysterical patient and connected with visual representation of another movement.

7. An auditory representation can be separated from the corresponding motor representation and connected with the opposite.

Narath,⁸_{Feb. 22, '90},²_{Apr. 6} read notes on two cases at a recent meeting of a medical society. An hysterical girl, aged 18, stated that she had run a needle accidentally into her arm. The needle could be felt under the skin, but when an incision was made it could not be extracted. No sutures were applied. Three days later the bandages were removed; the wound was found to be gangrenous. The slough slowly increased in size. Nitric acid was applied, and, when the new slough caused by that caustic separated, healthy granulations developed. The wound became smaller; nevertheless, after a few days it became gangrenous again. The slough was examined and, to the surprise of the surgeon, no bacteria could be found. The girl was then watched, and it was discovered that she tried to irritate the wound through the bandage in all manner of ways. At length it was found that the patient produced the gangrene by the application of an irritant green pigment. She managed to cause a slough thirteen times, until a complicated bandage was applied, and the wound at length healed.

In a second case a woman was accustomed to set up gangrene and all sorts of skin eruptions with caustic alkali. Narath believed that the majority of the cases of so-called spontaneous hysterical gangrene were simply instances of malingering.

Gilles de la Tourette,²⁴_{Aug. '90} describes a condition of the breast, under the name of "hysterical breast," which he considers of much

importance not only as it is a well-defined manifestation of hysteria, but also from the fact that it has given rise to errors in diagnosis and needless removal of the organ. It consists of a temporary enlargement of the breast with considerable hyperæsthesia of the skin covering the organ. This hyperæsthesia, liable to vary, becomes much more marked during the menstrual flow ; there is then, also, more swelling, and considerable pain is complained of. On palpation at such time it is possible to perceive one or two tumor-like masses in the substance of the breast, about the size of a hen's egg, but which are not painful, the hyperæsthesia being cutaneous. The affection is often of long duration, especially in those cases where there is faulty therapeusis, as often happens. It seems to depend on an hysterogenous band of hyperæsthesia at the level of the breast, which induces an œdema of the connective tissue of the gland. In this way are produced the local swellings.

Hysteria in the Male.—N. P. Dandridge⁹⁰ gives an interesting account of certain cases of hysteria in the male which have come under his observation. He recognizes the fact that the disease is more rarely seen in men than in women, but in the male the disease usually presents itself in one of the milder forms, and such manifestations as the contractions, the vomiting, and the hysterio-epilepsy rarely occur. In his experience the disease has approached the type found in neurasthenia, and has been due to overwork, intense application, or overpowering anxiety.

Dandridge states, with regard to the treatment of hysteria in men, that it is less frequently dependent on anæmia and want of proper nourishment than in women, and therefore the question of a sufficiency of nourishing food is not so important and so hard a difficulty to meet. In those cases, however, where excessive use of stimulants and anodynes or narcotics has been indulged in, proper feeding is of extreme importance, in order to place the individual in a position to combat the cravings to which he has yielded. Massage, especially in connection with Turkish baths, will often have a happy effect, but prolonged rest in bed is not frequently of benefit. Relief from the anxiety of wearing and anxious duties, combined with prolonged and even severe out-of-door exercise, is more likely to restore the true and healthy condition of mind and body than anything else. The ability to take rational and refreshing sleep is usually the first step toward improvement.

G. J. Preston, of Baltimore,¹⁸⁹ Oct., '96 reports the case of a man, aged 31 years, a moderate drinker, who during a fight received slight bruises. A day or two after admission into the hospital a small patch of anæsthesia appeared. There was complete loss of tactile,

pain, and temperature sense; muscular sense was greatly impaired, but not entirely lost; while taste and smell were lost and hearing impaired. There was great constriction of the visual fields and the color-fields were reversed. The reflexes, superficial and deep, were normal, as was the electrical reaction. The patient gradually improved and finally recovered under hypnotic suggestion. The author states that total anæsthesia is a comparatively rare condition if the cases of transient loss of sensation be omitted. Stress is laid upon the necessity of a careful examination of the visual fields.

Diagnosis.—Hugh T. Patrick, of Chicago, ⁶¹_{Sept. 21, '98} called attention to a distinguishing trait not yet described,—namely, almost instantaneous shifting of the line of demarkation between the anæsthetic and normal areas. This peculiar feature applies equally well to hyperæsthesia.

Clozier ¹⁴_{Apr. 10, '98} applies the name of “hysteroclasic zone” to regions which, when pressed upon, cause the hysterical attacks to cease. The author especially studied the cardiac zone, which presents constant hysteroclasic powers; in other words, pressure over this region always arrests the paroxysm. He expresses the opinion that hysteria is due to various peripheral influences, and that heredity plays no part in its causation.

A. Pitres ⁷³_{Dec. 22, '94} describes two cases in which rhythmical borborygmi occurred synchronously with respiratory movements, the rhythmical character of which has apparently escaped the observation of most authors who have referred to the presence of borborygmi in hysterical subjects. The attacks or crises of borborygmi are regular, lasting from two to four hours; the noises begin suddenly, are loud; a rumbling is evident on palpating the epigastrium and left hypochondrium; they cease when the patient lies down; the patient usually feels some discomfort; the crises end also suddenly. Emotional disturbance often seems to determine the origin of the trouble, and the immediate cause is frequently the taking of food. The duration of the disease is long—years often—and it is a source of much annoyance to the patients. Antidyspeptic and antispasmodic remedies are without avail, and treatment altogether is almost futile. It is uncertain whether they arise in the stomach or colon, but, no doubt, they depend on the spasmodic contraction of the respiratory muscles; so that Pitres looks on rhythmical borborygmi as one of the numerous varieties of the large nosological group of hysterical spasms.

Félix Lagrange ¹⁸⁸_{Jan. 4, '98} reports a case of monocular diplopia in hysteria. The author considered the diplopia in this case as an

hallucination of hysterical origin, with the chief interest attaching to the absence of any disorder of refraction.

Gilles de la Tourette, of Paris, ²³⁶_{Jan., '96} reviewed the opinions of various authorities upon the operation of castration for the treatment of so-called uterine and ovarian hysteria. Pitres states that the operation does not cure, but when cure follows it is simply owing to the moral effect. The operation is not legitimate and it may in itself produce changes which will require surgical intervention. Charcot, according to Pichevin, held that all such operations should be condemned in the strongest terms; he insisted that the operation of castration was absolutely contra-indicated in hysteria, hysterо-epilepsy, mania, etc. Such a condition as genital hysteria does not exist; the same may be said of genital hysterо-epilepsy or menstrual epilepsy. The author had never seen a case of hysteria or allied disorders in which castration should be considered for a moment. On the contrary, he had seen many patients who were subjected to Battey's operation, with no change in their original condition, excepting that they profoundly regretted having lost their ovaries. The tendency of the surgery of the present day is to return to older methods, which by modern research have been shown to be superior. It is just as logical to castrate an hysterical male or remove the skin of the scrotum, the seat of painful sensations, as it is to remove any hysterogenous zone or an hyperæsthetic ovary of a woman. The theory upon which operators base their procedure is false. Their practice is bad and immoral and should be abandoned.

Onanism.

Clara Barrus ²⁷⁸_{Apr., '96} states that the secretion of the præputium clitoridis is often a hardened, semi-organized mass, so hard sometimes as to merit the term "concretion," the mass being held there by a sort of superficial prepuce adhesion, in many cases removed with difficulty. That this should give rise to nervous irritation which would in many cases lead to pruritus and subsequently to masturbation is not surprising. The removal of such secretion and the destruction of the adhesions naturally leads to hope of ameliorating the mental condition. While this condition is often associated with masturbation, it also occurs in cases where the habit does not exist. The conditions may, however, have given rise to other nervous disturbances quite as pernicious, if not to masturbation itself. In dementia amelioration of the mental disorder cannot be expected even though the conditions be removed. At the same time it would be an unjustifiable neglect to fail to remove when possible a condition which may exert a pernicious

influence on the nervous system. The operation for removal of the elongated clitoris, which is so much in vogue, seems, to the author, a very reprehensible practice. The worst case of masturbation Barrus has seen is that of a young woman who has been clitoridectomized. This patient masturbated more or less all her life. After several attacks of nymphomania she decided to have the clitoris amputated. The operation increased the nymphomania, causing shameless—almost continuous—masturbation. Some cases persist in the habit in spite of everything that can be done, —padded mitts, restraining of hands and feet, the protection sheet, moral suasion. All means are tried to protect the patient from herself, with the result of seeing her, when thwarted, exhibit manifestations which show that she is indulging in a sort of vicarious mental masturbation, the centre of excitement apparently being psychical.

Treatment.—J. P. West, of Bellaire, Ohio, ²²²_{July, '98} recommends monobromide of camphor from 2 to 8 grains (0.13 to 0.52 gramme) daily, this drug seeming to exert a control without the deleterious effects caused by continued use of the bromides. As a rule, a tonic treatment will be necessary; but care must be taken in beginning the use of drugs of this nature, particularly with strychnia, as they overstimulate and cause a return of the practice.

Treatment of Mental Diseases.

Tuberculin.—Wagner, of Vienna, ⁸_{Feb. 22, '98} studied 200 cases. Amelioration occurred in various psychoses under the influence of intercurrent febrile disorders,—*i.e.*, typhus, malaria, recurrent fever, or the acute exanthemata, etc. From these the author concludes that cure or improvement will most probably ensue when the subject is not too far advanced and when the mental affection has not existed for too long a period, though cases of old standing have been recorded in which recovery ensued under these conditions. This curative action of febrile disorders on insanity stands on a level with the therapeutic action of other affections on certain diseases, notably those of nervous type,—*i.e.*, the effect of malaria on epilepsy, of small-pox on optic-nerve atrophy (as shown by Mauthner), and of typhus on progressive muscular atrophy, etc. Closely connected with this fact is the known power of infective disorders (*e.g.*, influenza) to induce organic changes in the nerve-elements,—changes which may be re-adjusted by a regenerative process in these elements. By this de- and re-generation the elements may, it can easily be surmised, be so favorably modified that the physical malady which expressed itself in a psychosis becomes nullified. The effect of an induced infection on insanity

has shown itself in a few isolated instances, the results being, however, imperfect and insufficiently uniform for deduction. To put these questions to a practical test, Wagner experimented with tuberculin, the cases being selected in which an unfavorable prognosis was being established, owing to the long duration and the inception of characteristic signs of mental degeneration. In its application there naturally had to be considered the possibility of the antecedent presence of tubercular infection and the individual predisposition thereto, which it is well known is of great variability. The initial dose was 0.001 gramme ($\frac{1}{800}$ minim). In the non-tuberculous subjects habituation to the medicament soon ensued; so that an increase of dosage early became necessary. He estimated future dosage by the intensity of the febrile reaction. Any further habituation to the chemical product necessitated the employment of the bacterial product in extract form,—a reason why other important proofs with other bacterial cultures—*e.g.*, of *bacillus pyocyaneus*, etc.—had to be suspended. The results obtained by this method appear, according to Wagner, to be most encouraging. Improvement is said to ensue in some cases most speedily, but in the greater number, to obtain a fairly satisfactory result, a prolonged treatment is necessary. Three cases have been reported as having been wholly cured by this means, while some have improved to such a degree that ultimate restoration to mental health might be reasonably anticipated. In the three cases reported cured the insanity had existed for three years in one and for two in each of the others. With the mental there was a corresponding physical improvement, and no ill effects appear to have followed the treatment.

Castration.—Kraemer, of Neustadt, ²⁹⁵ ₁₈₈₁, ²² ₁₈₈₅, collected all the cases he could find of ovariectomies and oöphorectomies performed for the relief of neuroses and psychoses, and has gathered together from various sources 300 such cases. In 200 cases the operation had a beneficial effect; in 100 it was doubtful or unfavorable. The author himself adds 4 cases to the number, 2 being those of young girls of 16 with hystero-epilepsy. Both of them were said to be cured, but the author argues that the same result could have been reached without mutilation. As it was, it was three and one-half years after operation before they could be pronounced well. The third case was a maniacal girl, aged 22 years, who recovered fourteen months after operation. The last case was a woman, aged 30 years, who suffered from hallucinations. Five months after the operation she was no better, but after this she gradually improved, and at the time of writing had been well two years.

Suggestion.—Voisin, of the Salpêtrière Hospital, ⁶_{Oct. 20, '94} calls attention to the curiously rapid and satisfactory action of hypnotic suggestion in dispelling delirium and hallucinations in the insane. Directly suggestion is completed, calmness succeeds to the previous agitation. Very frequently, however, hypnosis seems to be an impossibility in the insane. Voisin surmounts the difficulty by previously inducing partial anæsthesia by small doses of chloroform. Another useful preliminary proceeding is the administration of a very strong galvanic shock. The object of these preparatory measures (anæsthesia and electric shock) is to render the patient momentarily insensible to his mental pre-occupations. The opportunity is then seized to hypnotize him in the usual manner.

Thyroid Feeding.—C. K. Clarke, of Kingston, Ont., ³⁹_{Oct. '96} gives a detailed account of five cases subjected to this treatment, from which the writer concludes that cell-nutrition is undoubtedly affected in a striking manner, that increased metabolism occurs as the result of the quickened circulation, and that the autotoxic process that exists in some, if not all, cases of mental disease is interfered with in a way that may be beneficial. If, however, the vitality is low and the patient has not the ability to recover from the fever induced by the thyroid feeding, decided harm will result from the treatment and a very rapid decline in strength will probably take place.

Bruce ¹⁰⁶_{Jan. '96} reports twenty-five cases subjected to this method of treatment, and the following are the conclusions arrived at: The internal administration of thyroid induces a true febrile process, and the resulting reaction is beneficial; the amount required to induce physiological action varies in different individuals, but it is seldom necessary to give more than 60 grains (4 grammes) daily. Excessive and prolonged administration produces gastric irritation, and another danger is induced—heart weakness—which is obviated by confinement to bed. The administration of thyroid is contra-indicated in cases of acute excitement with rapid loss of weight and malassimilation of food; but it is specially useful in insanity of the adolescent, climacteric, and puerperal periods, and frequently so in cases where recovery is protracted and the tendency is to drift into dementia. In general paralysis it is hoped that benefit will accrue if the patient is treated at an early stage; and it is believed that thyroid feeding will prove a valuable addition to our armamentarium in the treatment of certain forms of insanity.

Duboisine.—Loicano and Masuro, ¹³⁹_{May, '96} conclude that the neutral duboisine sulphate is an excellent sedative in psychical and motor

agitation, especially of maniacal type. It is superior to the other sedatives in its prompt effect; in ease of administration, which is independent of the will of the patient, and in absence of the inconveniences attending hyoscyamine and hyoscine. The sleep produced is similar to physiological slumber. The different results obtained should be attributed to the different degrees of individual reaction. The dose varies from 0.0005 to 0.0015 gramme ($\frac{1}{1000}$ to $\frac{1}{666}$ grain). The dose that, in the majority of cases, gives the therapeutic effect without untoward symptoms is about 0.001 gramme ($\frac{1}{1000}$ grain).

Trional.—Steiner, ⁶⁹_{No. 13, '96} in comparing trional with sulphonal, unhesitatingly gives the preference to the former as an hypnotic. J. W. Irwin, of Louisville, Ky., ⁷¹_{Oct., '96} reports an unusual effect of trional in the treatment of insomnia. The patient took 45 grains (3 grammes) of trional (in three doses) during the night, and this dose was repeated three or four nights subsequently, with the effect of causing very profound sleep which lasted long into the afternoon of the following days. At the end of a week he became very feeble. Contrary to all previous reports, the heart's action grew weak and was decidedly intermittent; this condition was followed by aphasia, and loss of memory was very marked. There was disturbance in his gait. The author discontinued the use of trional in large doses. Eight months after he again prescribed trional for him, adding 1 grain (0.065 gramme) of caffeine to each dose, the dose of trional being 15 grains (1 gramme) and did not allow him to repeat it no matter whether he slept or not. The caffeine seemed to have a most happy effect as a heart stimulant, and he slept from five to seven hours each night. One day, however, Irwin was suddenly called to the patient's place of business, to find him almost in collapse, although he had taken only his usual dose of trional the night before. There was considerable cyanosis and the temperature was reduced to 96½° F. (35.8° C.). Discontinuance of the drug and proper stimulants brought the patient back to normal condition.

Chlorobrom.—Wade ²⁷⁸_{Apr., '96} ⁸⁰_{Aug. 15, '96} states that chlorobrom,—a mixture of equal parts of potassium bromide and chloralamid, dissolved in water,—first introduced to the medical profession by Charteris, of Glasgow, a little over a year ago,—has less action upon the heart and blood-vessels than chloral. The combination, although a depressant to the circulation and heart, is probably less so than the bromides or other allied drugs. It is less disagreeable to take than paraldehyde, which, although a safe and reliable hypnotic, cannot be disguised when taken, has an objectionable odor, and imparts to the breath a strong scent. Paraldehyde is

often followed by lassitude, headache, or sickness in the morning. Chlorobrom, on the other hand, is not particularly disagreeable to take and leaves no ill after-effects, and did not cause, in any of the cases in which it was used, any derangement of the stomach or bowels.

Keay ⁶_{Mar. 18, '96} has used the drug with favorable results, and recommends it highly in melancholia, especially active melancholia; and in the threatened melancholia or brain exhaustion from overwork, and in worried business men, when insomnia is the most serious symptom to combat. In mania, general paresis, and the excitement of epilepsy he has found the drug not suitable, preferring sulphonal or trional. He administers 1 ounce (31 cubic centimetres) of the solution one hour before retiring, and if the excitement is great he increases the dose to 1½ or 2 ounces (46 or 62 cubic centimetres) with perfect safety.

Sulphonal.—In the Marburg Clinic for Mental Diseases Schedtler ¹¹⁶_{June, '96} ²⁴²_{Sept., '96} administered this drug to forty-one insane females. As a rule, the usual doses were given. Restless and apprehensive cases received from 0.05 to 0.3 gramme ($\frac{7}{8}$ to 4½ grains) several times in the twenty-four hours. Disagreeable effects were repeatedly observed. The objective symptoms which in the insane he considers especially important are in mild forms of sulphonal intoxication,—drowsiness, pallor, and nausea, shown by frequent spitting and uneasiness; also vomiting, staggering gait, and sometimes diarrhœa. If the sulphonal be discontinued when these characteristic symptoms first appear, the patients, without exception, recover completely. Permanent ill effects were never observed. The dose necessary to cause intoxication fluctuated between wide limits and appears to depend upon individual idiosyncrasy. The great majority of the patients to whom this remedy was regularly given for a long time bore 1 to 2 grammes (15½ to 31 grains) a day without any unfavorable influence. In two cases, however, marked symptoms were observed. The first received a relatively large amount of sulphonal in a short time (from June 8th to July 5th 68 grammes—2½ ounces) and suffered from vomiting and diarrhœa. The patient presented a miserable, dejected appearance. Some sugar was found in the urine, but no albumin. Upon discontinuing the sulphonal the condition improved and recovery took place. The symptoms, in the second place, pointed to cerebral toxæmia. There was also a cutaneous eruption present. Even when this drug is well borne Schedtler advises that it should never be given in daily doses of from 2 to 3 grammes (31 to 46 grains) more than several months without discontinuing it from time to time, or changing it for

another narcotic. By observing carefully these rules, cases of severe intoxication have not occurred in the clinic for the past two years.

Miscellaneous Methods.—Ponticaccia ¹²¹_{Feb., '96} recommends bromoform very highly in acute maniacal states. He begins the remedy with 15 drops a day, which are divided into hourly doses, and increases it every day by 5 drops until from 20 to 50 drops are given per day. Employed in this manner it causes no disagreeable after-effects, and in general does not influence the health beyond a slight diarrhœa, which is easily controlled by opium. Its sedative action is always prompt and decisive; so that it need not be administered for more than fourteen consecutive days.

G. Albertotti ⁶⁰⁵_{V. 16, Nos. 1, 2, '96} ²⁷⁸_{July} makes a preliminary report on his results of treating mental disease by artificially causing abscesses by the hypodermatic injection of turpentine. In three paretics he obtained improvement, quieting agitation in one; modification of grand delusions and increase of muscular power and some mental improvement in the second; and in the third improvement to the extent of rendering the patient, hitherto incapable, able to perform manual labor.

In three cases of stuporous melancholia, one cured, one improved, one unimproved. One hysterical melancholiac cured; one hystero-epileptic, in a state of violent agitation, immediately improved after the injection of the essential oil.

In five furious maniacs there was notable improvement in three, none in the other two. One case of excited chronic mania and three agitated melancholiacs are under treatment.

J. Luys, ²¹¹_{July 14, '96} basing his opinion upon the special and elective action of potassium bromide on the bulbar region and with the particularly elective action of opiates and of chloral on the cerebral lobes, formulated the following mixture, which he has employed daily in his hospital practice, as well as in his private practice, with good results:—

R Potassium bromide,	2 drachms (8 grammes).
Chloral hydrate,	½ drachm (2 grammes).
Syrup of morphine (French Codex, ¼ grain to the ounce),	1 ounce (30 grammes).
Distilled water,	3½ ounces (108 grammes).

A tablespoonful of this mixture is to be taken every two hours. If the patients are violent, the entire quantity may be given during the day and again in the night. A very marked sedation is obtained at the end of twenty-four hours.

In the treatment of insomnia E. N. Brush ⁵⁹_{Jan. 12, '96} deplors the multiplication of hypnotics, which has been encouraged by phy-

sicians so much of late. H. R. Stedman, of Boston, ²⁴²_{Dec., '94} contributes a valuable general article on the management of convalescence and the after-care of the insane.

INEBRIETY, MORPHINISM, AND KINDRED DISEASES.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO
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Alcoholic Inebriety.

THE labors of the year upon this subject have contributed strong evidence in favor of the opinion that moderate drinkers, though to all appearances in good health, are, nevertheless, the ultimate victims of a gradual toxæmia. The physiological functions are first impeded, then arrested; organic changes come on stealthily, and a mortal disease, ascribed to anything but its true cause, prematurely ends life.

Effect on Elementary Organisms.—Gaule, of Zurich, ¹⁴_{Aug. 25, '96}, alluding to the fact that experiments upon elementary organisms had shown that alcohol caused their atrophy by removing the water contained in them, and therefore their vital activity, stated that experiments in his laboratory, by Obersohn, had demonstrated that alcohol, as was the case with chloroform and ether, tended to destroy cellular protoplasm. The cells that were most sensitive to its effects were precisely the most complicated ones as far as functions went,—nerve-cells, for instance. This fact explains why the latter should be the first to become affected. The influence of alcohol upon protoplasm was long ago pointed out by Lionel Beale.

Wilkins, of Kansas City, ¹_{Sept. 22, '96}, who conducted an extensive experimental investigation upon the subject, supplemented by fifty-one post-mortem examinations, and who prefers the term "textometer"—mother of tissues—to the less comprehensive name "protoplasm," states that the parietes of the cells inclosing the germinal matter are dissolved; the albumin not in combination is coagulated; the red blood-globules are deprived of a part of their contents, which mingles with the liquor sanguinis, leaving them shrunken and wrinkled; the organizability of the textometer is impaired. The immediate result is to fill up the connective tissue with foreign compounds, thus favoring the growth of the various

tumors and neoplasms. The chemical selective power is either impaired or entirely destroyed, rendering wounds difficult to heal. This is caused by one of two conditions. In one instance there is an abundant proliferation of pure germinal matter, which cannot be organized owing to the effect mentioned above, and degenerates into pus-cells,—the direct result of overstimulation. In the other instance the *vis metabolica* is suspended, because the ganglions are deprived of phosphorus and protagon by the direct solvent action of alcohol. This deficiency prevents the proper organization of the neurodynamia in the gray matter. Hence the injured soft parts disintegrate, neoplasm forms in the wounds, while the broken bone receives no osteoblasts with which to repair the damage.

While alcohol is thus shown to injuriously influence normal protoplasm, J. J. Ridge, of London, ⁷²⁸_{Oct., '96} states that, even in minute proportions, it favors the growth and multiplication of many pathogenic organisms, micrococci and bacilli alike thriving with increased vitality. The list includes the bacteria of decomposition, the streptococci and the staphylococci of pus and of diphtheria. Alcohol thus weakens the resistance of the exposed subject and strengthens the inherent elements for his destruction.

Effects on the Mind and the Nervous System.—Forel, of Zurich, ¹⁴_{Aug. 25, '96} considers drunkenness as a short attack of madness. Three-quarters of the crimes against persons, a large proportion of suicides, venereal infections, frost-bites, etc., are the consequences of this “innocent amusement.” The fact that very serious and violent cases of intoxication are only seen in insane asylums is due to the short duration of alcoholic paroxysms. Ordinary acute alcoholic delirium, alcoholic delirium of persecutions, alcoholic mania, and melancholia might be mentioned as special forms. Alcoholic epilepsy, which is immediately cured by abstinence, should be reckoned alone. This is caused by a predisposition to epilepsy, which manifests itself under the influence of alcohol, even in so-called moderate doses. Certain cases of sexual perversion are entirely due to alcoholic excesses. Dipso-mania, generally observed in predisposed neuropathic subjects, is also curable by abstinence. Alcoholic dementia with amnesia, etc., bears a great resemblance to senile dementia, and, like the latter, is incurable. A great number of these affections are almost solely seen in predisposed subjects (neuropaths and degenerates). In the latter a latent predisposition breaks out under the influence of alcohol.

A. Smith, of Bodensee, ¹⁴_{Aug. 25, '96} has undertaken a series of experiments to determine the influence of alcohol on the quality and rapidity of certain mental operations, such as addition, associations

of ideas, etc., and reached the conclusion that intellectual power diminished under the influence of even small doses of this poison, and became, on the contrary, much more active when total abstinence from all spirituous liquors was observed.

Fürer, of Heidelberg, ¹⁴_{Aug. 22, '96} in similar experiments arrived at the same conclusions, and has also remarked that muscular strength, measured by the dynamometer, diminishes under the influence of even moderate doses of alcoholic drinks. It is false to say, in his opinion, that only a few unhappy, degenerate subjects become inebriates. Many individuals of talent and genius perish through the nefarious effects of alcohol. Only the *form* of alcoholism is determined by the pre-existing anomaly of the subject. Besides, geniuses are often neuropathic. Alcoholic psychopathia is often the consequence of individual addiction which, in turn, produces congenital psychopathia. Most psychopaths are very susceptible to alcohol, and their nervous system, especially the brain, is troubled by quite weak doses of this substance. Psychopathia and alcoholism cause one another.

[W. F. Farquharson, as I had done at the London meeting of the British Medical Association in August, credited a large share in the genesis of melancholia to agencies lowering the general health, among which alcohol was conspicuous, Farquharson having found 11 per cent. of asylum cases of melancholia due to intoxicants, many victims of suicidal melancholia who had no insane heredity having had a family history of inebriety. Melancholia frequently followed after an alcoholic outburst.—N. K.]

Klippel, ³⁶¹_{Sept., Oct., '94} from his observations, finds that the liver appears to invariably act as a factor in alcoholic delirium,—that is, even outside of those cases of delirium caused only by hepatic insufficiency,—and publishes the complete report of a case with autopsy and histological examination tending to prove this conclusion.

According to Vallon, ³⁶¹_{Jan., Feb., '95} psychomotor hallucinations in alcoholism are rare. The writer has observed two cases, which he publishes.

Liepmann, ⁴_{Apr. 2, '96} has made experimental research to find if peripheral excitations were really the first cause of the illusions and hallucinations of alcoholic delirium; to this end he studied in a number of patients the reactional effect caused by compression of the eyeball. Whereas, in healthy individuals, Purkinje's figures were seen, 41 of the 52 patients with alcoholic delirium had visions of objects and persons. In a certain number of them the power of creating visions persisted from twelve to eighteen hours after the cessation of the spontaneous delirium; in one patient the

visions caused by pressure of the eye preceded the commencement of the delirium by one day. Part of the subject of the visions certainly proceeded from Purkinje's figures. These are the sun, moon, stars, the heavens, lightning, clouds, etc. In about one-half of the visionary deliriums they were writings or printed matter, the size and color of the letters of which they could plainly distinguish, and which were nearly always the same, and they could read them easily, but spelt them out with difficulty; sometimes the words had no sense or it was only separated letters and figures. Inanimate objects predominated: they were houses, toilet or other articles of common use, and spectres. Strangely enough the appearance of animals was very rare, and among them there were neither rats nor mice. Many saw places and streets crossed by carts and men. Generally these visions were considered as those of real objects seen across a dark room; they had no connection one with another, and were neither terrifying nor agonizing,—a contrast with spontaneous delirium. To ascertain if the want of light was not the essential cause of the phenomena, Liepmann experimented with the eyes closed and covered with a cloth bandage, but not tightened; he found that under these conditions a proportion of the patients with alcoholic delirium had visions. One of them even, placed with open eyes in a dark room, could read. Jolly,⁴_{Apr. 8, '96} who has repeated Liepmann's experiments, confirms these results, and does not believe that the diversity of the alcoholic drinks can explain that of the hallucinations, founding this belief on his observations in four towns very far from one another,—Munich, Würzburg, Strasburg, and Berlin,—where the relative use of wine, beer, and brandy presents notable differences; he has noticed visions of animals in 50 per cent. of the cases of alcoholic delirium. Leppmann,⁴_{Apr. 8, '96} draws, from his experiments in over 1000 cases of alcoholic delirium, the fact that visions of animals are seen in 40 per cent. of cases at most, and that generally the delirium is associated with ideas of persecution and grandeur; in elderly patients and those relapsing, ideas of grandeur usually appear at the climax of the delirium. As to the diversity of the hallucinations, Leppmann credits them to the difference of alcoholic drinks. A special character of these patients is their absolute incapability of estimating distances.

According to W. F. Wilkins, of Kansas City, Mo.,¹_{Sept. 25, '94} the most important effect of alcohol on the tubular neurin is shrinking and hardening of the neuron, the shrinking being in direct ratio to the concentration of the alcohol and the length of time it is subjected to its influence. Narrowing of the lumen of the tubules ensues, and the function of the intertubular vesicles is

impaired and their capability to transmit impulses from the nerve-centres is either limited or entirely suspended. The shrinking and consequent hardening are the direct results of exosmosis. By the inordinate and continuous use of alcohol there is a dissolution of the vesicular neurin by the dissolving out from the intercellular contents of phosphorus, protagon, and lecithin, the extent of this disorganization being in proportion to the amount used and strength of the liquor. The free phosphorus can be detected by its luminous appearance while the urine from an old inebriate is being deposited on the ground in a dark place, and some observers assert that they have seen this luminous appearance in the exhalations from the lungs of these cases. In the encephalon alcohol has a selective affinity for the vesicular neurin of the cerebellum and affects it much more readily and extensively than it does the cerebrum. The intellect may be comparatively clear, while the attitude and locomotion are nearly, if not quite, destroyed. This, of course, results from a partial, if not complete, paralysis of the motor centres of the base of the brain. In chronic alcoholism there is a degeneration of both the vesicular and tubular neurin in the lateral columns of the anterior pyramids with destruction of the intercellular contents,—a much more destructive and far-reaching pathological condition than a mere irritation, or neurosis proper. Unless a lethal dose has been taken the effects are, in a great measure, only temporary. Herein the result is different from the effects of alcohol on the cerebrum.

[The statement as to hardening of the neuron and other tissues by alcoholic ingestion requires further corroboration. Frequently microscopical appearances are deceptive. Not long ago I heard a paper read by an intelligent and experienced microscopist, illustrated by beautiful drawings, which were held by the reader to represent the appearance and growth of a fungus in cancerous tissue, but which a "crowd of skilled microscopical witnesses" showed to be simply appearances produced by caustic potash. Induration of brain-structure is not what one would expect from the action of alcohol when swallowed, though, of course, this would, with shrinkage, follow the topical application of the poison. Without in the slightest discrediting the accuracy of the description of Wilkins, and of the conclusions drawn by him therefrom, it would seem unwise to enter upon a critical examination of these till the original observations have been repeated and confirmed by other microscopists.—N. K.]

Effects on the Digestive System.—Wurtz and Hudelo, of Paris, ¹⁴_{Jan. 20, 76} conducted an inquiry with a view of determining if acute alcoholic intoxication could cause in animals a diffusion of

microbes similar to that produced by cold, asphyxia, and certain poisons. They found that intestinal bacteria were driven out during alcoholic coma. In one-half of the number of rabbits killed during alcoholic coma the peritoneum and the blood in the vena porta contained micro-organisms; the other animals, intoxicated with the same dose of alcohol, returned to health after a few hours. These experiments therefore show that, during life, under different influences, but all causing intestinal congestion, the intestinal microbes enter the peritoneum and the blood of the vena porta. They, therefore, think that this diffusion of the microbes perhaps plays a certain rôle in the etiology of certain forms of peritonitis and liver affections.

Koulbine, ³¹_{Jan. 18, '96} after a study of the lesions caused by chronic experimental alcoholism in animals in which he kept up a chronic intoxication with impure alcohol, found, in the liver, fatty degeneration, swelling, and vacuolization; the cells appeared reticulated and transparent. There were proliferation of connective tissue and hyaline degeneration of the blood-vessels, biliary ducts, etc. The stomach was first attacked by acute catarrh, which then became, chronic, newly-formed connective tissue having appeared between the layers of the gastric wall.

According to Wilkins ¹_{Sept. 22, '96} the effects on the digestive tract and intestines vary according to the nature of the secretions and parts with which it comes in contact. In the mouth the ptyalin in the saliva is precipitated, forming an insoluble compound that has no proper place in the animal economy. The small amount of albuminous matter is coagulated, rendering the saliva less potent in its action on starchy foods. The fermentative power of ptyalin being neutralized by alcohol whenever they come in contact, an important physiological function is interfered with. In the stomach the pepsin is precipitated, the peripheral nerves in the gastric follicles are paralyzed, and the flow of the stomach secretions are nearly if not quite suspended. The sympathetic filaments in the stomach are stimulated and a retrograde peristaltic movement is excited and the contents are sometimes ejected. The irritability of the stomach is due to the paralysis of the vaso-dilators, while the constrictors are stimulated, shutting out the gastric juice. The stomach is inflamed and covered with a tough mucus, streaked here and there with a bloody slime, the remains of ruptured arterioles in the mucous follicles.

On the Small Intestine and its Secretions.—The effect of alcohol on the secretions that find their way into the duodenum is disastrous to the proper digestion of the oleaginous foods, and is responsible for the fatty degeneration of the heart and other organs.

The pancreatic secretion is nearly entirely coagulated by alcohol, rendering the pancreatin inert so far as emulsifying fat is concerned. It is true the coagulated secretion is redissolved into its former elements by pure water; yet it is impossible to restore it in the presence of alcohol, as there is a mixture of water and alcohol, in which the secretion will not dissolve. The stearin of the fat is dissolved by alcohol out of the fat-globules. This dissolution is probably aided by the duodenal secretions. The remainder of the fat becomes a foreign body in the circulation, and, being a compound of palmitin and olein only, does not possess that property by virtue of which it is attracted to the adipose vesicle, but is deposited in the different tissues, in the various cavities, in the different organs, and even in the ventricles of the heart and in the great blood-vessels, thus constituting fatty degeneration. The glycogenic function of the liver is modified and restricted by the excessive use, continued any length of time, by preventing the rehydration of glycogen, without which it cannot be taken up by the capillaries and put into the circulation. This result is caused by a union of the alcohol with the water, which, as we have seen, cannot be used in any physiological process; a mixture of alcohol and water producing a pathological result instead of a physiological one. The oxygen of the blood and water—i.e., pure water—is prevented from uniting with the bilirubin to form biliverdin. Physiologically, therefore, even a small quantity of alcohol is inimical to life, the preliminary element of the neoplastic deposits occurring in the so-called “gin liver, hob-nail liver, whisky liver, etc.,” being a result of the paralysis of the vaso-dilators of the absorbents directly concerned in the metamorphic analysis of the parts.

[A somewhat curious and novel plea for moderate drinking, based on an alleged beneficial influence of alcohol in slowing what he holds to be the too rapid digestion of our time, has been advanced by Sir William Roberts, of London. Having found by experiment that alcohol, in various quantities, hindered digestion, very large quantities quite stopping the process for a time, he came to the conclusion that we are, as a rule, suffering not from slow, but from too rapid digestion. He says that the modern art of cookery has attained so high a degree of perfection, and the food-products are so elaborately prepared and made digestible, that the danger is an undue acceleration of digestion; that we are in danger of accumulating too much flesh from this. We therefore need alcohol not to aid digestion, but to hinder it. This conclusion of Sir William Roberts can hardly be accepted as anything else than an academic theory. Clinical observations of the performance of

the digestive function in living human subjects does not exhibit, as a rule, improved digestion on the administration of alcohol. In some cases there is for a time less discomfort experienced, which is due not to the arrest of digestion, but to the alcoholic anæsthetic influence. This temporary relief is simply a relief from pain, not a correction of an unhealthful digestive condition. In fact, while this fleeting ease is felt, it will usually be found that, in the long run, the morbid state will have been intensified and confirmed. If this abnormal state has arisen from temporary disturbance, it sometimes happens that the digestive function will have recovered its integrity within a brief period, when there will be no occasion for any anæsthesia. But in a large proportion of cases alcohol, thus administered, will tend to set up other troubles, which will persist after the alcoholic medicine is withdrawn.—N. K.]

E. Cassaët¹⁴ observed a case of momentary suppression of the hepatic functions in acute alcoholism. Analysis of the urine showed a precipitation of urea to the amount of 3 grammes (46 grains) per litre (quart), a large quantity of biliary salts, and marked alimentary glycosuria during the entire duration of the acute period. These various functional symptoms only disappeared twenty-one days after the attack of delirium, and the general health improved at the same time. This suggests the necessity in such cases of making a careful and complete examination of the organ, for, while there may be neither angiocholitis, congestion, or atrophy, the gland may, nevertheless, be affected as far as its inherent functions are concerned, and be unable to retain sugar, produce urea,—i.e., carry its metabolic function,—all of which conditions lead to serious icterus with or without the existence of cholæmia, which may give rise to the delirium cited. This case also appears to prove that the primary lesions do not occur in the interstitial connective tissue, but in the parenchyma itself, which fact would tend to overthrow the theory, admitted up to the present time, as to the pathogenesis of chronic hepatitis.

Respiratory System.—In a study of the comparative effects of alcoholic beverages, Lancereaux, of Paris,¹⁴ emphasized the opinion, which he has sustained over thirty years, that alcoholic excesses represent one of the principal causes of tuberculosis. Without denying the fact that tuberculosis is the result of the action of a special microbe upon the general system, he is more and more convinced that this action, as is the case with other agents, is never exercised except in predisposed organisms. The fact that phthisis was principally met with, in the country, among individuals addicted to drink, was already noted among several writers of the last century, and the author could produce

many proofs in its support. These proofs are of two kinds,—the symptoms of this disease in drunkards and its frequent occurrence in the same individuals. The phthisis of drunkards presents peculiar characteristics both as to its localization and its evolution. In contradiction to the classical statements which fix this localization at the left apex, in front, which is correct in phthisis resulting from insufficient aëration or alimentation, the drunkard's tuberculosis is located at the right apex, toward the back, in the form of granulations, producing a diminution of elasticity upon percussion. The malady generally improves, after a first attack, sometimes accompanied by hæmoptysis, and, if the patient leave off his bad habits and nourish himself in a proper manner, he frequently recovers. Unfortunately, this is rarely the case; a second and a third attack occur, and the disease, at first apparently not of an alarming character, suddenly assumes a most serious proportion, owing to extension and dissemination of the tubercles. In some cases these are generalized from the beginning, and even here it is not impossible to observe an arrest in their development. In certain drunkards the tuberculosis simultaneously affects both lungs, the peritoneum, and the meninges, and quickly causes death, especially in market-porters, coopers, and dray- or truck- men. In all cases alcoholics and essential oils, by diminishing organic combustion and being eliminated by the lungs, create, at the same time, a general and a local predisposition, which furnish a field proper for the development of the bacillus of tuberculosis.

Lagneau,¹⁴ contributed valuable evidence in support of these views by a careful study of the increase of tuberculosis, which he found corresponding to that of alcoholism. Alcoholism only became notable in France after the phylloxera had ruined the vines and curtailed the supply of wine. At that time consumption was only one-half as frequently met with in men as it was in women; at present the conditions are reversed, twice as many men being affected as women, who, as a rule, in France, are not addicted to the excessive use of liquor.

Effect on the Kidneys.—According to the observation of Wilkins,¹ the first and most frequent effect of alcohol on the kidneys is a polyuria, that *per se* is of little consequence unless it becomes chronic. When it does, which is apt to be the case, and other changes favorable take place, we have a glycosuria or diabetes insipidus and, later on, diabetes mellitus. Not that all inebriates have diabetes mellitus, but, when there is inordinate use of alcohol in a proper subject, the result is inevitable and the conditions on which diabetes mellitus depends are obtained.

Effects on the Blood-System.—J. J. Ridge⁷²³ recalls the works

of Prout, Edward Smith, Harley, Schmiedeberg, Vierordt, and others, showing that alcohol has a decided action on the hæmoglobin of the blood-corpuscles. It lessens the absorption of oxygen and also the exhalation of carbonic dioxide. Every function of the body is thereby affected; all vitality is temporarily lowered; congestion of various organs is promoted. This condition, produced but once, may undoubtedly pass off and leave no trace; but the more it is prolonged and the oftener it is repeated, the more serious will its effects be.

Wilkins¹_{Sept. 22, '94} states that alcohol paralyzes the vaso-constrictors and at times stimulates the vaso-dilators of the capillaries and arterioles in the immediate vicinity of the affected parts, causing an hyperæmia, afterward producing a stasis of the circulating fluid and its consequences. A secondary effect in the case of stasis in the capillaries of an organ is the diminution of proper pabulum by the inactivity of the communicating plexuses. This remotely results in either a permanent hypertrophy, as in a case where collateral circulation has been established, or in atrophy, as in a case of ulceration and final destruction of a part of the vascular system in the organ. In the cases of hypertrophy the alcohol has a selective preference for the vaso-constrictors, paralyzing them, while it stimulates the vaso-dilators. The lumens of the blood-vessels and capillaries become fixedly enlarged to their greatest extent; the organs enlarge to an enormous proportion. If, on the other hand, the selection is made to paralyze the vaso-dilators and stimulate the vaso-constrictors, there is atrophy of the organ.

Comparative Effects of Different Alcohols.—G. Daremberg finds,¹⁴_{July 21, '96} from chemical analysis, that brandies—especially old brandies of good brands—contain larger quantities of the poisons called furfurol and amyl-alcohol than the common brandies sold in the Paris bar-rooms. Toxicological experiments confirm the chemical analysis.

Albert R. Leroux¹⁶¹_{July, '96} thinks that too great stress is laid on pure “unadulterated” alcoholics, which gives the impression that, if whisky and other stimulants are only pure and free from adulteration, they would be comparatively harmless. This he seeks to contradict, by saying that it is the alcohol in all such stimulants that has the effect, and a man may become a drunkard from pure as well as from impure whisky; and, indeed, in analyzing whiskies taken at random from the highest and lowest dealers he claims that the cheap whiskies do the least harm, because they contain the least amount of alcohol. The adulterations are usually inert and of little effect as compared to the alcohol contained. The alcoholic drinks, from beer with its 2 per cent. of spirit to brandy

with its 60 per cent., all depend on this spirit for their intoxicating effect, whatever the other ingredients may be. The purest does just as much harm and probably more than the adulterated.

Rochard ¹⁴_{June 26, '95} insists upon the fact that ethyl-alcohol, even when pure, is a poison, and that its use should be restricted. Its consumption has doubled in twenty years; statistics show that, in France, six litres forty-five centilitres of alcohol are drunk per person on which duty is paid; competent authorities think that the amount introduced in contraband is at least as great.

Laborde ¹⁵²_{July 26, '95}; ¹_{Aug. 17, '95} alluded to a former communication in which he had tried to show that the proper rectification of all alcohols, and particularly the alcohol of commerce, as constituting the solution of the hygienic problem in regard to alcoholism. One of the most dangerous impurities of alcohol, he said, was pyromucic aldehyde, or furfurol. Experience had proved that an alcohol of a superior type chemically and atomically—such as amylic, propylic, or butylic alcohol—was essentially of a superior toxicity to that of the alcohol of the ethylic type. The alcohol distilled from wine or from the wort of grapes was less toxic than the alcohols of grains, beet-root, etc. During the period when natural wine and alcohol had been drunk only the drunkenness of exhilaration had been observed, scarcely exceeding the limits of joviality. The drunkard of to-day presented stupefying intoxication and death. There was also the impulsive drunkenness of this particular alcoholic intoxication which led to the most horrible crimes.

Magnan ¹⁴_{July 21, '95} also considers all alcohols as poisons, but they are so in different degrees. He gave 50 grammes (1½ fluidounces) of wine alcohol, beet-root alcohol, and maize alcohol, reduced to 50 degrees, to dogs. The results were: Wine alcohol produced depression and inebriety, which started fifteen minutes after ingestion and disappeared after four or five hours. Beet-root alcohol produced a comatose sleep and complete anæsthesia after eight or ten minutes; this condition lasted twenty-four hours, but the dog remained unwell for several days and lost appetite. Maize alcohol gave the same results, but also produced, during the coma, subsultus tendinum. These three alcohols were then carefully rectified; they all again produced the same effects.

At the Budapest International Health Congress Alglave ³⁸⁷_{Oct. '94} showed that the cause of alcoholism lay much less in the quantity of alcohol absorbed than in the bad quality of the alcohol. The experiments of Dujardin-Beaumetz and Andigé showed that, in order to kill an animal, it was necessary to administer five times more ethylic alcohol than amylic alcohol. Pure ethylic alcohol, boiling at 79 degrees, was evaporated by the lungs almost as soon

as it was introduced into the stomach, and thus, so to speak, only traversed the organism. It was that which gave the drunkard's breath its characteristic odor. Amylic alcohol, on the contrary, only boiled at 140 degrees; so that, at the temperature of the human body, it scarcely evaporated at all. Once introduced into the organism, it remained there and accumulated, the day's dose being added to those of the day previously, as those were added to anterior doses. However small the quantity taken daily, it finished by accumulating in the organism a considerable quantity of this toxic alcohol.

Heredity and Alcoholism in Children.—Mansfield Holmes, of Denver, Col., ⁷²⁸_{Aug. 76} while visiting the Dalldorf Asylum, of Berlin, found that, of 1234 insane patients, 450 were children. Investigations by local authorities had shown that the effects of alcohol, with reference to insanity, were twofold: 1. It produced *acquired* insanity by acting as the exciting cause. 2. It produced *hereditary* insanity by bringing about organic changes, which changes are transmitted to children in the form of predispositions. Rust, the physician in charge of the asylum, considered periodical drinking to excess as more likely to produce acquired insanity, but that habitual drinking was more detrimental to the offspring and more likely to produce hereditary insanity. The large percentage of insane children in Germany was accounted for by the fact that habitual drinking is the rule, and not the exception. H. Piper, of the same asylum, stated that, up to 1882, the time when he began his observations, the total number of reliable cases included in the German statistics then gathered amounted to 1287. Of this number 860, or 66 per cent., were traced to hereditary causes and 427, or 33 per cent., to acquired causes. These figures show the proportion of hereditary to acquired cases to be two to one. Of the 416 cases compiled by H. Piper, during the twelve years following 1882, he has traced 310, or 75 per cent., directly to hereditary causes, and 106, or 25 per cent., to acquired causes, showing the proportion of hereditary to acquired cases, in his statistics, to be three to one.

Moreau, of Tours, ³⁶¹_{May, 1884, 76} considers alcoholism in children, unfortunately so prevalent, as due, in great part, to hereditary influence. Drunkenness, in these cases, may manifest itself at a very early age, a small quantity of alcohol being sufficient to cause intoxication. He also ascribes to heredity the cases met with in very young children that present, besides an irresistible desire for drink, marked evidences of evil disposition, leading to criminal tendencies. The Continental custom of giving young children wine to drink as a beverage is a powerful contributive

factor, while indiscriminate prescribing of alcoholic medicines by physicians is partly responsible.

Another form of hereditary alcoholism is due to what the author terms the observance of traditions of families and countries, such as local customs of giving alcohol to children, as in Scotland, Austria, etc. Delirium tremens has been reported as occurring in children of 4 and 5 years of age. The clinical picture corresponds very closely to that in adults, and is caused by traumatism, or a sudden stopping of alcohol in children who are habitual drinkers. True alcoholic cirrhosis of the liver occurs in children 8 to 12 years of age. Many interesting cases are cited, showing dipsomania in young girls on their first menstruation, boys very drunk at the ages of 12 to 13 years, and also of younger children in the expansive stage of partial intoxication.

Legrain, of Paris, ^{July 20, '96} presents tabulated observations leading to the conclusions that (1) double parental alcoholism creates an irresistible tendency to drinking in the children; (2) parental absinthism seems directly to transmit (very frequently fatally) epilepsy to the offspring; (3) the parental combination of absinthe drinking and epilepsy is a common cause of epilepsy in the children.

Fürer, of Heidelberg, ^{Aug. 25, '96} states that the generative cells of the drunkard are alcoholized, and that the children, therefore, are frequently psychopathics, rachitics, idiots, or degenerates. The tendency toward drink, on the contrary, is transmitted in the form of an hereditary disposition. There are, therefore, two different kinds of heredity, the last named being the only true form. The first is an intoxication which directly deteriorates the germ. Nevertheless, one of these forms often engenders the other. He considers that it is absurd to expect an evolutionary adaptation of mankind to alcohol, insuring immunity against its poisonous effects. The facts prove the contrary. The intoxication of the male and female germs weakens the resisting force against alcohol in the descendants, instead of strengthening it. An evolutionary adaptation to narcotic poisons does not and can not take place.

Féré, ¹⁸⁵ ^{Mar. Apr., '96} in a series of experiments conducted with a view to ascertain the influence of alcohol upon the avian embryo, dosed a number of hens' eggs with a small quantity of this agent. He obtained several living chicks 21 days old, but the generality of them had not yet reached, at that date, the term of their development, having still a voluminous yelk; those not killed by the alcohol were not able to emerge from the shell before the twenty-third day. Especially interesting is the fact that these chicks presented monstrosities such as celosomy, or more frequently slight

anomalies (double terminal phalanges and nails, crossed beaks, etc.), one of the subjects being at the same time epileptic. These were degenerates.

Wilkins, of Kansas City, ¹_{Sept. 22, '94}, thinks that if conception take place at the time one or both of the parents are intoxicated, or have been for a length of time sufficient to cause a deficiency in the essentials of the nerve-centres, there will be a corresponding deficiency in the child. Not that all children of inebriates are weak-minded or idiots; but when the conditions are as stated, a weak mind or complete idiocy is the inevitable result.

Treatment.—T. D. Crothers, of Hartford, Conn., ²⁸²_{Oct., '94}, considers our present conception of the extent, nature, and character of inebriety as based on erroneous theories, and that our methods of dealing with inebriates are most disastrous and fatal in not only destroying the victim, but perpetuating the evil we seek to lessen. With the majority of physicians to-day he is of the opinion that these cases should be recognized as diseased, and be housed in farm colonies, under military care and treatment. They must be organized, employed, and placed under hygienic surroundings and made self-supporting. Careful medical study of these classes and full recognition of their needs and requirements are urged, public sentiment being stimulated to sustain rational means and measures in their treatment. The author concludes that the sanitary problems that confront our civilization are very closely associated with the inebriate class. The same views are expressed by many writers, including Marandon du Montyel ⁸⁷⁹_{Dec., '94} and Ladame. ²⁶_{Dec. 1, '94} Norton, of Capel Lodge, ²_{May 25, '94} is strongly of the opinion that while drugs, Turkish baths, etc., are useful as adjuvants, the only effectual cure is brought about by persevering attempts on the part of the medical attendant to develop the will-power of the patient.

C. C. Carter, of Columbus, Ohio, ⁹_{Mar., '94} states that the physiological antagonism between atropine and alcohol does not seem so generally understood as it might be. If small doses (less than $\frac{1}{100}$ grain—0.00065 gramme) of atropine be administered hypodermatically three or four times daily to a victim of the liquor-habit, it will produce a great distaste for alcoholic liquors in from one to five days. Whisky will become repellant both as regards sight and odor, and will have a most intolerable taste, resembling turpentine or benzin. If, under these circumstances, drinking is still attempted, it produces nausea and vomiting, without the addition of apomorphine or any substance whatever to the liquor. The drinker will almost invariably be turned completely against liquors in less than five days. Tonics should be administered if required.

In a case of alcoholism Waugh, of Chicago, ²⁰²_{June 25, '96} employed a remedy which many years ago was greatly advocated in England for the purpose of rendering spirits nauseous,—i.e., ipecac. Twenty minims (1.3 grammes) of the fluid extract produced sleep lasting all night, while 40-grain (2.60 grammes) doses of chloral and of sulphonal had failed. No emesis was caused. The patient was put to sleep every night of the following week, the drug being employed in doses varying from 10 to 30 minims (2 grammes) with no water, followed by dorsal decubitus for at least five minutes in order to avoid possible nausea and vomiting.

The depression which follows the period of excitement in alcoholics incites them to a fresh use of liquor. A baneful circle is the result, and in this way the drinker becomes the victim of alcoholic intoxication. To cure this incessant longing for drink Zdekauer ³¹_{Jan. 12, '96} recommends:—

R Chlorated water,	. . . . .	8 grammes (2 drachms).
Decoction of althæa,	. . . . .	165 grammes (5½ ounces).
Cane-sugar,	. . . . .	8 grammes (2 drachms).

M. Sig.: A tablespoonful every two or three hours.

The existing gastritis is relieved, appetite returns, the hypochondria disappears, and in some cases the patient was completely cured of the pressing longing to drink which had held him for years. Zdekauer concludes that the immediate cause of the longing for alcohol in alcoholics suffering from gastritis is a peculiar irritation of the gastric nervous supply.

Strophanthus is highly recommended by Skworzow ²⁴_{Oct. 14, '96} who obtained surprising results in three cases in which the alcoholic excitement had lasted from three to six weeks. One dose of 7 minims (0.45 gramme) was sufficient in one case; in the other two the paroxysm was arrested after the third dose. Nausea and sweating followed, but these symptoms soon ceased. The drug seems to provoke intense aversion to alcohol.

Bauzan ³⁵_{Oct. 1, '96} shows, by fairly conclusive observations, that all the manifestations of alcoholism, either acute or chronic, are benefited by hypodermatic injections of strychnia, the daily amount administered not exceeding, as a rule, 0.006 gramme ($\frac{1}{11}$ grain). The following formula is recommended:—

R Strychnine sulphate,	. . . . .	0.04 gramme ($\frac{3}{8}$ grain).
Distilled water,	. . . . .	10.00 grammes (2½ drachms).

Each Pravaz needle contains 0.004 gramme ($\frac{1}{16}$ grain) of strychnine. The treatment is begun by injecting one-fourth of the contents of the needle, increasing daily until the third or fourth day 0.006 gramme ($\frac{1}{11}$ grain) is injected. The treatment is finished after progressive diminution of the dose. The injections

are not painful, and no accidents can follow this method of administration. The first symptoms indicating intolerance are: weight, tension, and tremor of the limbs; sensation of constriction at the temples, nape, neck, jaws, etc. The beneficial effects may be sustained by continuing the strychnia in granules of 0.001 gramme ($\frac{1}{84}$ grain).

Haskovec⁸⁴_{Apr. 7, '95} obtained satisfactory results in alcoholic delirium from chloralose in doses of 10 grains (0.65 gramme) dissolved in warm water. The sleep caused by chloralose is quiet. It diminishes the tremor. Although not having any specific properties, chloralose is superior to chloral hydrate in that, given in relatively small doses, it produces an hypnotic effect quite equal to that produced by the exhibition of massive doses of chloral hydrate, which latter often gives rise to more or less severe accidents. Chloralose produces no injurious secondary effects.

Russell Bellamy¹_{7.80, p. 72, '94}⁵_{Dec., '94} gives 20 grains (1.3 grammes) of trional mixed with water, with 10 minims (0.65 gramme) of tincture of capsicum after a calomel purge. A very hot bath is given, its temperature being gradually lessened. If in thirty minutes the delirium show no signs of abatement, 10 grains (0.65 gramme) of trional are given. In all cases forced feeding in small quantities, often repeated, is followed, the diet consisting of milk, eggs, and soups. He submits the following conclusions: 1. Delirium was controlled with greater rapidity and safety by trional than by other hypnotics. 2. In a majority of cases a marked stimulant was observed, possibly on account of the methylic and ethylic elements which enter into the drug. 3. On account of the low temperature noted in all cases, trional must possess antipyretic properties, thereby simulating its allies of the phenol group. 4. It was always well borne by the stomach, and in one case was rapidly absorbed when administered *per rectum*. 5. No unpleasant after-effects were observed, and in all cases save two recovery was speedy.

Bushnell⁹_{Aug. 31, '95}⁷⁸⁰_{Sept. 14, '95} reports 23 cases in which hypnosis and hypnotic suggestion were tried. Eighteen were hypnotized on the first attempt, one on the second, one on the third, and one on the fifth. The patient was told to fix his gaze on an object while the operator stood behind him and stroked the forehead evenly with both hands. Generally the eyes closed spontaneously in from two to ten minutes. In some cases they remained open and required to be closed with the hand. A more effectual, but less agreeable, method was to sit facing the patient, whose eyes were to look fixedly into those of the physician. Hypnosis being induced, suggestions were given that the patient have no craving for liquor; that

it be disagreeable to the taste and unpleasant in its effects; that sleep, appetite, and digestion be good. The author states that it is well to suggest that there be no "nervousness" and no pain in the eyes, and, especially in the case of those who are hypnotized with difficulty, that there be no drowsiness or headache on awakening. Hypnotism becomes easier with each repetition. The treatments are repeated, if possible, daily for a week, then once a week for a month. The results of treatment were: Remained abstinent, 8; relapsed, but abstinent after further treatment, 3; relapsed and passing out of reach, declining treatment, or continued to drink in spite of it, 8. Bushnell has noticed that it is easy to render whisky repugnant to the senses of the patient, but it appears to be impossible to accomplish this in the case of beer. The loss of tolerance and cessation of craving for alcohol are reached, however, in the one class of drinkers as certainly as in the other. The number of relapses from the so-called "gold-cure" is increasing according to T. D. Crothers,⁹ who, also, observed that symptoms of acute insanity were common in the cases submitted to this method.

[For reasons stated in my "Treatise on Inebriety," I cannot recommend the ordinary employment of subcutaneous injection, administration by the mouth being as efficacious and accompanied by less risk. Neither can I approve of hypnotism. Disgusting an inebriate with alcoholic intoxicants is not to cure the disease of inebriety or narcomania,—a process requiring from months to years. There are a multitude of so-called "three-week cures." As the two hundred and sixtieth, a philanthropic lady engaged in rescue work brought to me a proposal from a chemist to disclose to me, in confidence (of course, he was to have a royalty), the ingredients of a mixture which "had never failed," and "could be proved," said the lady, "by abundance of original testimonials!" Time, patience, control, and a study of the individual peculiarities of each case are essential to accurate diagnosis and sound treatment. Strychnine and sometimes atropine, judiciously employed, are at times useful; but there is no specific. Many other less perilous drugs are also serviceable.—N. K.]

Legislation.—Paul Sérieux, of Villejuif,⁶⁸⁵ contributed a comprehensive description of the inebriate asylums of the United States and Great Britain, as a basis for the elaboration of similar institutions in France and Austria, where inebriety is greatly on the increase. Christian³⁶¹ ⁹⁹⁶ argues that it is only after the production of alcohol shall have been subjected to a special legislation that the construction of asylums for inebriates need be undertaken. Meilhon,³⁶¹ alluding to this subject, quaintly asks

why it is that law strictly regulates the sale of mineral water and tar-lozenges in France, while it accords the greatest freedom to dealers in spirits to poison their fellow-men. He recommends strict State control over the sale of intoxicating beverages. Each year an administrative regulation should fix the price, varying according to the importance of the locality, of drinks the consumption of which is allowed in saloons, bar-rooms, etc. He suggests two procedures: Either the raising of the price to such a degree that it will be too expensive for the consumer, which would effectually prevent too frequent libations, or its reduction to so low a figure that the dealer would realize but a very slight benefit from its sale. He would thus find it impossible to continue so unlucrative a business. In both cases the list of prices is to be a fixed and invariable one, and in full view of the customer. On the other hand, establishments selling the so-called hygienic beverages (tea, coffee, chocolate, milk, fruit-syrups, etc.) should have full liberty to set their own prices, and should be exempt from all the restrictions imposed upon the tavern-keepers. This would prove a first step toward the establishment of temperance *cafés*, such as those inaugurated in certain countries, and which show such excellent results.

Lancereaux, of Paris, ¹⁵²_{Mar. 4, '96}, while far from denying the importance of inspecting articles used as food, and of boiling milk under certain circumstances, declares that such measures are mere trifles in view of the vast good that might be done by an efficient inspection of drinks and by constant efforts to bring about a diminution in the amount consumed. He lays stress upon the dire effects produced by absinthe, the use of which has increased very greatly of late years in Paris. Chronic absinthism has become much more common, while alcoholism has been nearly stationary. He had been of the opinion, till quite lately, that the suppression of a certain number of public-houses and levying an impost on alcoholic drinks would suffice to arrest the increase of drunkenness; but, since the pernicious effects of those drinks which contain essences have been appreciated by him, he has been of another opinion. As these drinks are by far the most deadly of all, on account of the essential oils which they contain, the sole means of avoiding the danger is to forbid the addition of such oils to alcohol, if not, indeed, to forbid their consumption, or, if it be preferred, their manufacture.

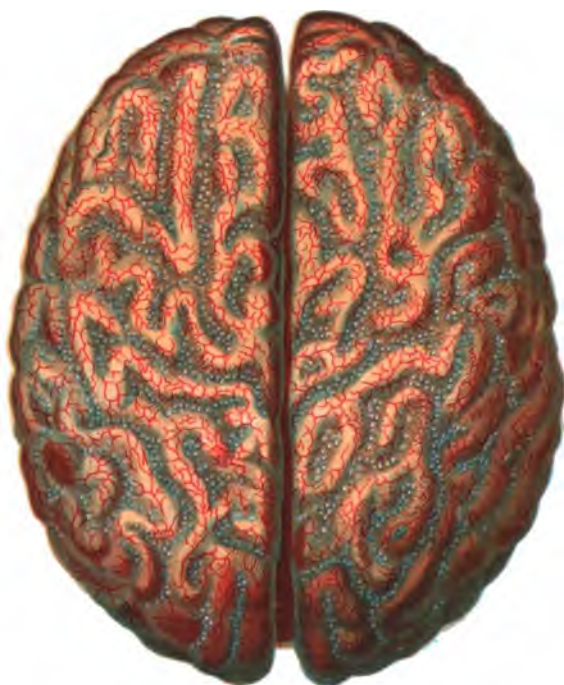
To the assertion that measures of this kind would suppress industries which enrich the country, Lancereaux replied that such industries do not enrich the country; on the contrary, they impoverish it and tend to ruin it, and they are responsible very



Fig I



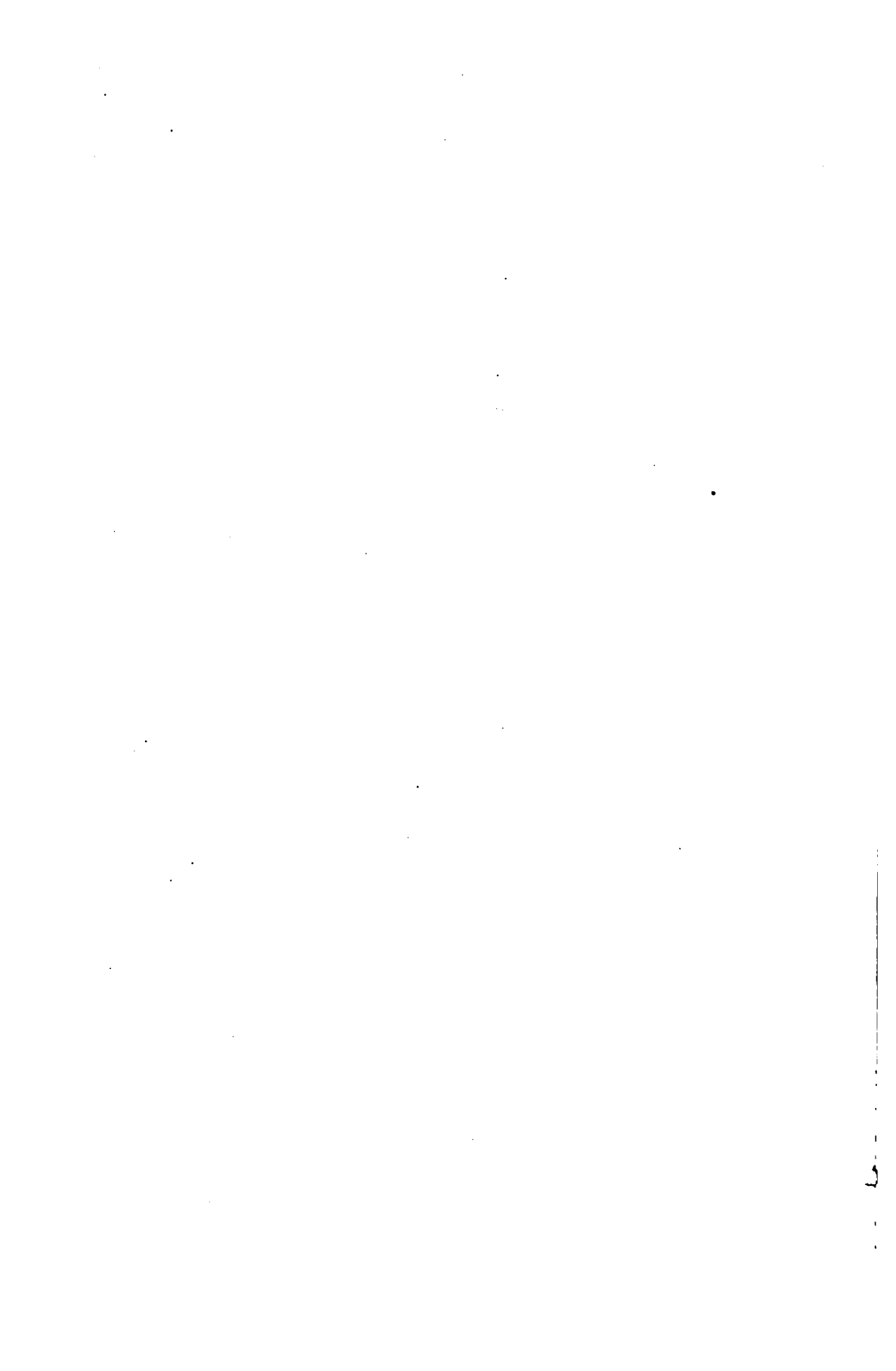
Fig II

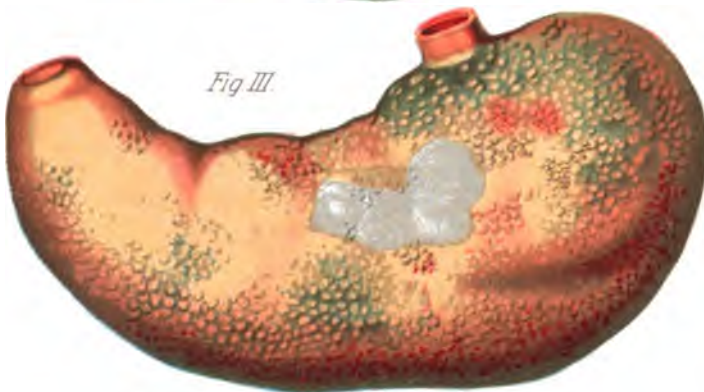
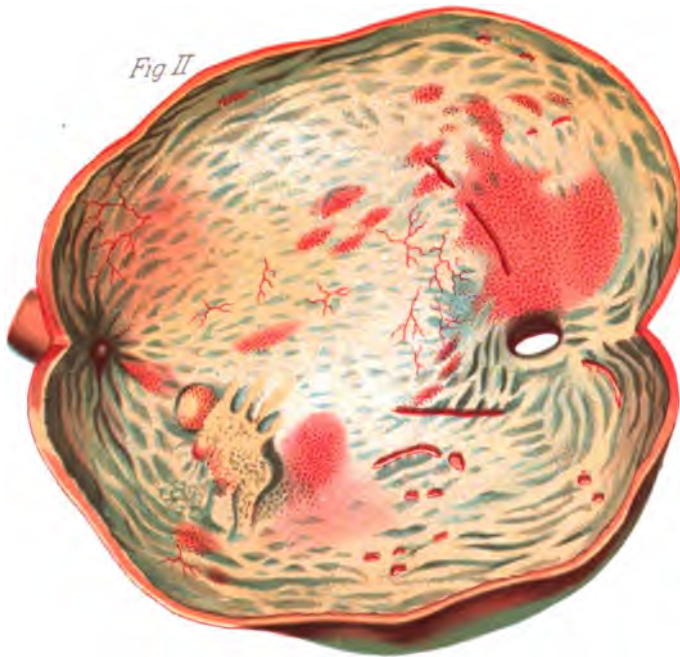
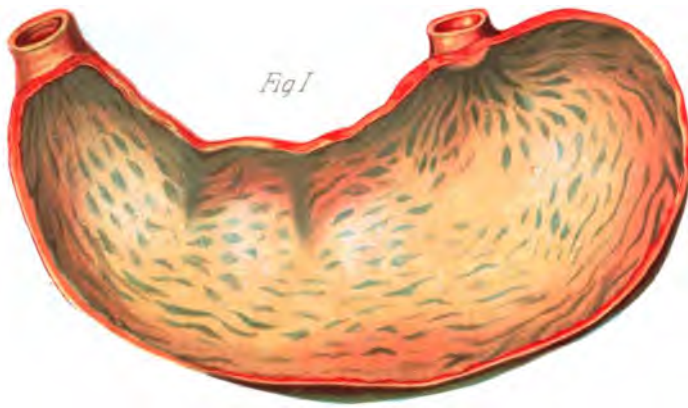


Lesions produced by Alcoholism (Lancereaux Charcot)

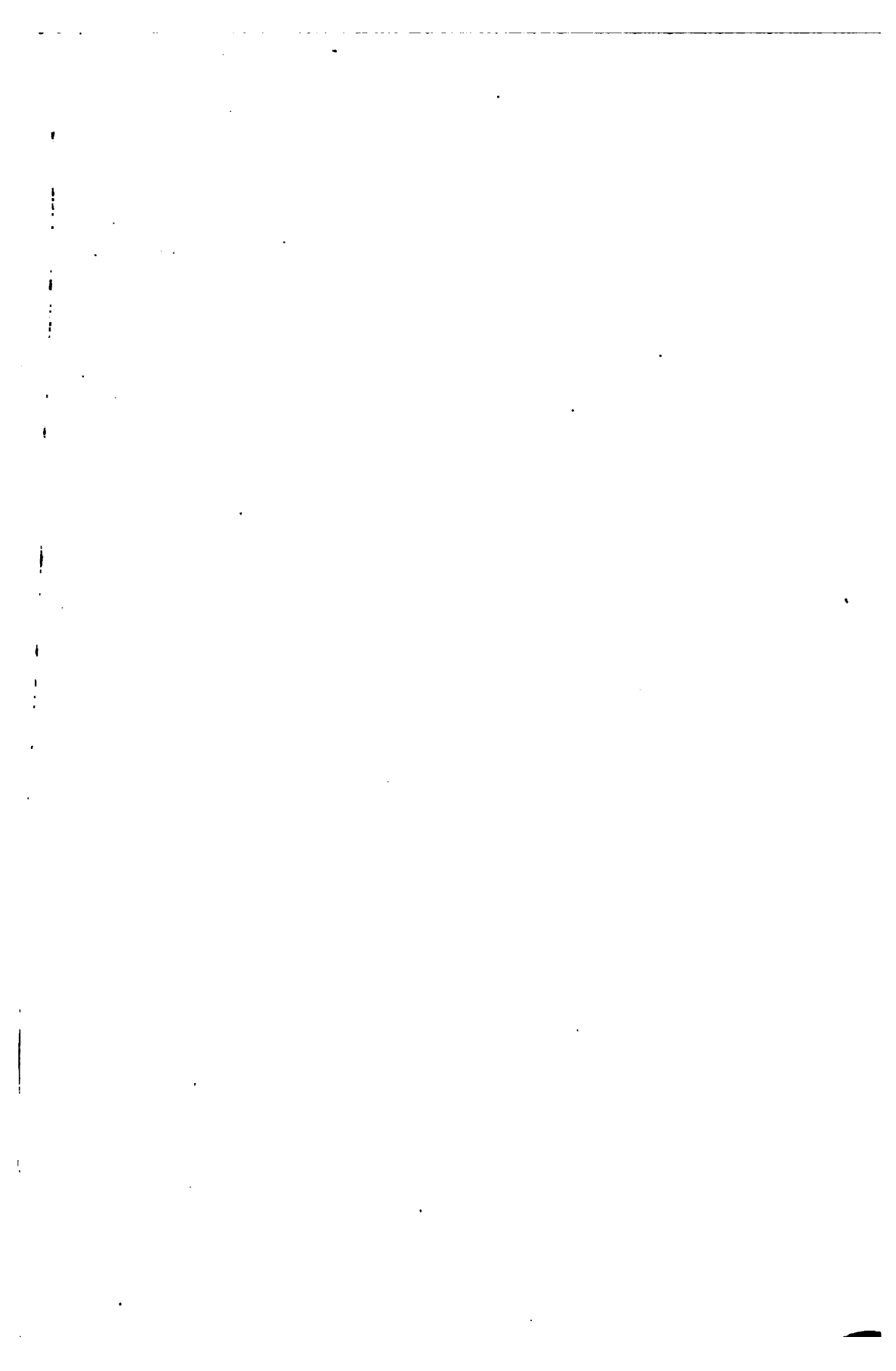
Fig I Normal Brain Fig II Alcoholic Meningitis

Geneva Section of the Swiss League against Alcoholism





Lesions produced by Alcoholism (Lancereaux Charcot)
Fig I Interior of Normal Stomach Fig II Lesions of Gastric Mucous Membrane
Fig III Lesions of Gastric Wall
 Geneva Section of the Swiss League against Alcoholism



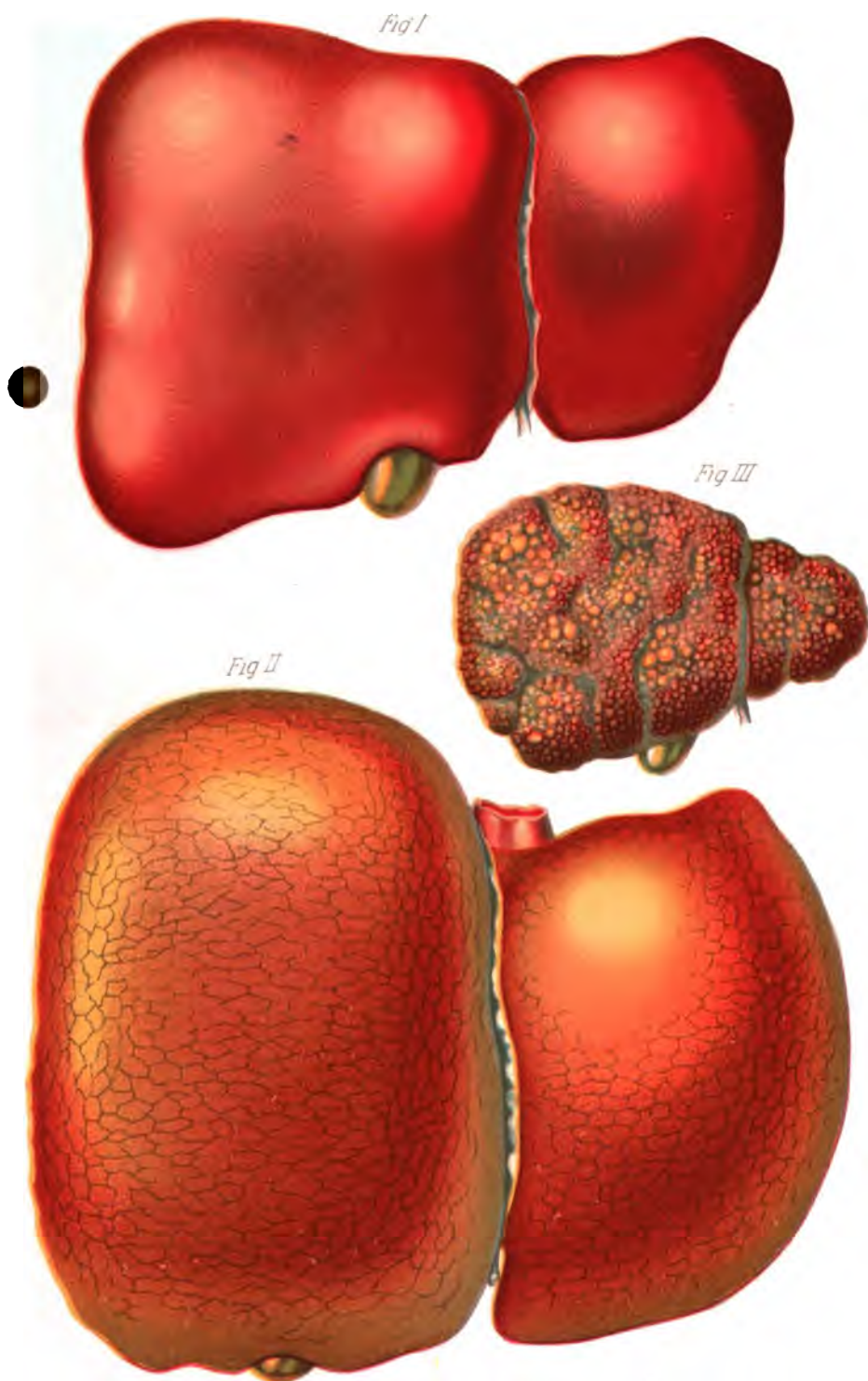


Lesions produced by Alcoholism (Lancereaux Charcot)

Fig I Normal Heart Fig II Fatty Heart Fig III Normal Kidney

Fig IV Hypertrophied Kidney Fig V Contracted Kidney

Geneva Section of the Swiss League against Alcoholism



Lesions produced by Alcoholism (Lancereaux Charcot)
Fig I Normal Liver Fig II Hypertrophied Liver Fig III Atrophied Liver
 Geneva Section of the Swiss League against Alcoholism

largely for the diminution of the population. The government of Roumania lately refused to allow an establishment to be erected for the preparation of "aperients" from absinthe, and the republic of Ecuador quite recently forbade the importation of such drink into its territory. The author rightly thinks that France ought to follow the good example thus set by other nations and forbid altogether the use of drinks containing essential oils. The legal steps suggested are: 1. To reduce in a large proportion the number of taverns. 2. To reduce considerably the tax on cider and beer. 3. To place a moderate tax on wine. 4. To increase in a notable proportion the tax on alcohol and render the liquid absolutely free from all noxious ingredients. 5. To forbid the manufacture of all drinks made from essential oils—absinthe, etc.—as producing a pernicious action on the human organism and reckoned now amongst the principal causes of depopulation of the country.

To antagonize the spread of alcoholism the French government has determined to introduce a series of lectures in the schools bearing mainly upon self-respect, temperance, domestic and social duties, the horrors of alcoholism being strongly impressed upon the minds of the pupils. In the chemistry and anatomy lectures, in which alcohol and fermentation are treated of, the same thesis will be elaborated, as also in lectures on sanitation and in political economy. In the anatomy and physiological lectures the professor will describe the organs in their normal condition, and afterward by illustrations demonstrate the fatal effects of alcohol. The great influence enjoyed by teachers in general in France will seriously assist in bringing this project to a successful issue. With the same object in view and to show the public at large the dangers which the use of alcoholic beverages engender, the colored plates shown herewith were published by the Geneva branch of the Swiss Patriotic League against Alcoholism, the original engravings showing the organs in their normal size. The models were obtained from Lancereaux's "Atlas of Pathological Anatomy" and from Charcot's works, the whole being supplemented by an explanatory monograph by Revilliod and Binet, of Geneva.¹⁹⁷
Oct., '94

William H. Burr, of Philadelphia,¹⁹
May 11, '96 advocates radical measures against those who encourage drinking. In his opinion the man or woman who carelessly encourages or invites a person who has been addicted to the alcohol habit to take alcohol in any form is guilty of one of the gravest crimes in the calendar, and such an act ought to be punished as would be a deliberate attempt to poison or assassinate a fellow-man.

In the report of the Ohio Board of Pardons for 1894 it is stated that, in most cases, it is deemed judicious to include, in the

recommendation for pardon, a condition requiring abstinence from the use of intoxicating liquor. The board report that, in nearly every case of crime against the person, the offender was either under the influence of liquor or became involved in an affair by reason of being in a place where intoxicating liquor was sold. A pardon conditional on the practice of abstinence would thus lessen the liability of the pardoned prisoner to a renewed criminal act.

Morphinomania.

Hodée ²⁰⁰⁰ demonstrates that morphinomania is not exclusively limited to the upper classes, and that it is beginning to affect the lower ones as well. The working class is most frequently subjected to the primary cravings of this passion in the hospitals, where hypodermatic injections of morphia are too freely resorted to. The individuals furnishing the greater contingent of morphinomaniacs are the predisposed and the overworked. Among the predisposed subjects four classes of hereditary influences are generally the primary source of the trouble,—hysteria, alcoholism, hypochondria, and neurasthenia. The overworked may, secondarily, be subdivided into two classes,—the professionally overworked and the *blasé*, useless, and overwrought members of society, mentally and physically exhausted, who are ever in search of stimulants to enable them to maintain their debilitated nervous systems in a state of equilibrium. In the first the intoxication is in consequence of a professional necessity; in the second it is the result of inactivity.

According to a series of statistics collected from German and French physicians, it would appear that the medical world furnishes an enormous percentage of morphinomaniacs,—i.e., more than 30 per cent. In the United States the proportion is even greater, according to J. B. Mattison. ⁶¹

Volfowitsch ⁸¹ _{May 1, '96} relates a case of morphinomania in an infant 4 months old, the drug having been administered by a nurse in increasing doses to induce sleep. The practice being stopped by the family physician, the child gradually failed, and to prevent a fatal issue the administration of the drug had to be renewed. When the child was 7 months old it had not developed beyond the proportions of an infant of 2 or 3 months, the sight and hearing being *nil*. Death soon ensued.

Treatment.—The year was prolific in reported cases, demonstrating that complete and sudden withdrawal of the drug is followed by no deleterious results, and that the success attending the measure is practically universal. The pathology of the temporary condition induced is well shown in a paper by P. Sollier, of Paris,

who ³_{Aug. 17, '96} studied the effects of demorphinization upon the liver. Under the influence of morphia intoxication the functions of the liver are diminished; this is also the case with the other glands of the organism. After the suppression, on the contrary, it presents a very great overactivity and diarrhœa, sometimes vomiting, then occurs. During the first forty-eight hours the stools and the material vomited consist almost exclusively of pure bile in large quantities. Chemically no morphia is found, but clinically everything goes to prove that it must be contained therein, and that, whatever be the form in which it figures in the organism, it is in this way that the stored-up morphia is eliminated. The practical conclusion resulting from this fact is, therefore, that the evacuation of bile should be allowed to be as abundant and as prolonged as possible.

The copiousness and the suddenness of the evacuation may be such that the great quantity of liquid withdrawn from the organism may occasion serious symptoms, due to bulbar asphyxia, and which may prove fatal. These cases, which are, however, exceptional and clinically easily foreseen, demonstrate the absolute necessity, in all cases, of the constant presence of a physician during the final suppression of the morphia. The functional overactivity of the liver and of all the glands, particularly of the digestive tract, occasions an active organic regeneration, accompanied by a cellular renovation, only complete after several months. The greater the evacuation of bile, the more complete the regeneration, but the more serious, also, the early relapse, in consequence of the delicacy and the susceptibility of the regenerated elements, which are incapable of resisting a new intoxication. This fragility of the glandular elements explains why substances, either toxic or otherwise, capable of injuring them, should not be administered, either at the time of suppression or during the period of convalescence in demorphinization, under the pretext of preventing the diarrhœa, which is the means of elimination of the morphia, or of combating the insomnia. Such procedures only serve to impede or to entirely arrest the work of regeneration and, consequently, the complete recovery.

M. V. Ball, of Philadelphia, ⁹_{June 29, '96} sustains these views by a series of six cases. Three of these were prisoners, who, on arrival, were placed in the ordinary prison-cells, each one separately. They were given the usual bath on admission and clothed in the prison-clothes and carefully searched, so that no particle of the drug was taken into their cells. All close intercourse with the outer world was prohibited. They were fed on the ordinary prison-fare. Tobacco in small quantities was allowed them, but

it was furnished by the prison. The sudden deprivation of opium produced the usual symptoms,—severe diarrhœa, vomiting, insomnia, etc., with the usual weakness and irritability. The stomach would not retain anything for several days. The men were visited daily, but beyond this absolutely nothing was given them, either in the form of medicine or special food. They were told that the struggle would be a severe one, but short. In less than ten days all desire for the drug had ceased. The stomach became more tolerant, the diarrhœa ceased, and in two weeks the patients were rid of all symptoms and all longing for opium. The loss in flesh was soon made up, and they now declare themselves as feeling better than ever before.

In several cases in which the drug has been gradually withdrawn and the emesis and diarrhœa treated with other medicine the suffering, though not so acute, was prolonged, and the desire persisted for a much longer period. M. E. Hughes, of Brooklyn, ¹_{Mar. 2, '98} and J. M. Taylor, of Morgantown, N. C., ¹_{Apr. 22, '98} relate cases of remarkable fortitude on the part of patients, in which sudden cessation was followed by cure.

Gaillard ⁹⁹⁸_{Feb. 10, '98} and Hodée, of Paris, ¹¹⁵³_{July 27, '98} also advocate sudden cessation to shorten the crisis, but recommend adjuncts to counteract local disorders of the stomach, liver, etc. Rendu, ¹⁶⁴_{Nov. 1, '94} in an ataxic *habitué*, suppressed the drug, and the pains, which it had not relieved, disappeared at once.

As regards the gradual withdrawal of the drug S. H. Green, of Oakdale, Ga., ⁸¹_{July, '98} relates two interesting cases of morphinomania in which the daily dose was 400 grains (25.65 grammes) in the one and 360 grains (23 grammes) in the other. The patients being prisoners, the author was able by substitution of quinine, given with general tonics, to completely cure them in the space of four months in the one and two months in the other, both increasing over 60 pounds in weight. One of the patients having become hospital-steward in the prison, handled morphine daily after his cure, but the drug had become repulsive to him. The only deleterious effects observed were cardiac irritability and pains in the limbs, but these rapidly disappeared. Comby ¹⁶⁴_{Nov. 1, '94} reported three successful cases in which the drug was progressively reduced in eight or ten days, sulphate of sparteine being injected hypodermatically to counteract the untoward symptoms. Harry Miller, of the U. S. Army, ⁵⁶_{June, '98} obtained encouraging results from vigorous exercise in the relief of the desire for the drug. Edward C. Mann, of Brooklyn, ⁸¹_{Aug., '98} gives the following outline of his treatment of the morphine habit, based on a clinical study of one hundred and fifty cases. Special attention must be paid to the heart and the vascular

system to obtain regular rhythmical action of the former and uniform tonicity of the latter. In addition gastric and hepatic disturbances must be corrected, while proper elimination of excretory products through the kidneys is to be insured. The morphia being gradually withdrawn, it should be impossible for the patient to tell when he ceases to take the drug. The author then recommends: 1. Proteid diet, which gives the most energy and force with the least expenditure of oxygen to digest and assimilate it. 2. Electricity in all its forms to strengthen the functions of the structures of the system. 3. Glycero-acid-phosphate (made known to the medical profession ⁶¹_{July 24, '94} as a nerve-food). 4. Milk in large quantity at night, or trional; also the prolonged warm bath, with cold to the head for insomnia. 5. Valerianate of zinc, combined with extract of belladonna as a sedative. As a reconstructive and stimulant tonic the author uses the glyceride of the hypophosphites, with iron, quinia (alkaloid), and strychnia, maltine and coca-wine, or fluid extract of coca. Centric galvanization and general faradization are highly praised. The last caution to give the patient when he leaves is never to permit any one to administer to him (or her, as the case may be) another injection of morphia, and, if necessary, to suffer pain rather than again fall into the toils of morphia addiction.

W. F. Waugh, of Chicago, ⁸³⁷_{Oct., '94} states that, whatever plan be adopted, the essential point is to obtain control over the patient. Unless this can be done, there is little hope of making a permanent cure. He places his cases upon the use of an alkaline water containing potassium bromide, carbonate and acetate, the proportions varying with the individual case. He also gives a cathartic on commencing treatment. No opium whatever is used, but each symptom is met by appropriate remedies. To reduce the severity of withdrawal hot baths are given, the patient being allowed to spend hours in the tub if he desire. Eserine has in his hands produced the best results as a sedative. J. Luys, of Paris, ⁸⁵_{June, '94} recommends small doses of phosphate of soda subcutaneously in glycerin and water, the morphia being decreased as the phosphate is increased.

Prophylaxis.—T. J. Happel, of Trenton, Tenn., ²⁰⁷_{July, '96} states that the amount of opiates sold by druggists is beyond the appreciation of physicians; they sell it day by day without knowing or even inquiring for whom it is bought. As long as any irresponsible party, or child of tender years, can buy without let or hindrance, the traffic can but grow. If the laws were enforced to the letter, and the name of the purchaser of every grain of morphine entered in a public ledger, and thus exposed to friend and

foe, when the buyer does not present the prescription of a reputable physician for the drug, a halt would, he thinks, promptly be called.

Caffeism.

Coffee.—Gilles de la Tourette, of Paris, ¹⁴_{July, '96}; ¹_{Aug. 10, '96} states that the symptoms due to chronic coffee poisoning should have special attention called to them, as they are liable to give rise to errors in diagnosis which would be very prejudicial to patients. Chronic caffeism is nearly always confounded with alcoholic troubles, particularly with those affecting the digestive and nervous systems, for the two poisons produced effects which singularly resembled each other. Caffeic poisoning shows itself chiefly in digestive and in nervous troubles, the symptoms of caffeic dyspepsia very nearly resembling those of alcoholic gastritis, such as catarrhal gastritis, saburral tongue, a marked loss of appetite, etc. The distaste for solid food is such that the patients eat nothing but bread soaked in coffee, and in this way the absorption of the poison is increased and becomes more and more marked. Nausea, vomiting, and acid eructations, which are sometimes very painful, supervene, and the patient becomes emaciated and falls into what Guelliot called caffeic cachexia. The circulatory system is also influenced. Palpitation is rare, but a diminution of the pulse is especially observed. The nervous symptoms are frequent and second in importance to the digestive troubles. There is insomnia, or, when the patient is able to sleep, there are dreams and terrible nightmares. Very frequently a decided trembling is noticed in the limbs, also a fibrillary trembling of the lips and of the tongue, which might become generalized in the other muscles of the face. Painful cramps of the thighs and of the legs and troubles of sensibility may be observed. The reflexes generally remained unaffected. These different symptoms are not persistent, as discontinuing the use of the poison is rapidly followed by great amelioration, certainly much more prompt than that which followed giving up the use of alcohol.

Miscellaneous.

Tobaccoism.—J. K. Crook, of New York, ⁴⁶²_{Nov., '94} recommends, for the treatment of angina pectoris in tobacco-users, the following preparation:—

R Alcohol. sol. trinitrine (1 per cent.)	15 drops.
Fluid extract of cactus grandiflorus,	2 drachms (8 grammes).
Hoffmann's anodyne,	5 drachms (20 grammes).

Sig. : Thirty drops three times a day in a little water. If necessary the dose may be increased gradually to 60 drops.

Jankan³³⁷_{July, '96} says tobacco is contra-indicated in diseases of the eyes, nose, throat, or pharynx, in peritonitis, enteric fever, etc. It may be allowed in syphilitics, sometimes in lung troubles, and in organic cardiac affections with great caution; in stomach disorders and in cardiac neuroses only if the smoke be filtered. In nervous diseases sudden withdrawal often is harmful. An epidemic of blindness in horses, pastured in 1894 in Australia, on the banks of the Darling,²_{Nov. 17, '94} has been attributed to the eating of the leaves of the Australian tobacco-plant *Nicotiana suaveoleus*. Tobacco poisoning often took two years to cause total blindness in horses. Their tobacco-amblyopia was incurable and, as in man, was not incompatible with bodily health. Tobacco-insomnia²²_{Aug. 7, '96} is attributable largely to its use as a nerve-stimulant to work late at night. In such cases tobacco is not a relaxation after a day's work, but a stimulus for the accomplishment of tasks which otherwise would have been impossible or difficult of achievement. When the mouth is parched after continuous smoking, recourse is had to alcohol for a filip, securing the toleration of another cigar or two. Under these circumstances tobacco acts as a cerebral irritant, interfering with the cephalic vasomotor centres so that the vessels are unable to adjust themselves forthwith to the condition required for healthy and untroubled sleep. So sometimes a change of tobacco or an unusually strong cigar at times keeps one awake.

[The more we learn of the effects of "the divine weed" on living organisms, the plainer it appears that tobacco has a deleterious influence on most animals, with a few exceptions, such as goats and pigeons. I have seen among men many cases of injury to digestion and sight, of heart-failure, and diminution of virility. There are a great many persons who cannot, even moderately, use tobacco without peril. There are more, however, on whom, when even freely used, it apparently does no harm.—N. K.]

Etherism.—The habit of becoming intoxicated on ether,¹_{Nov. 10, '94} which originally came from England, has existed in France for the last five or six years. The number of persons addicted to this form of debauchery seems to be growing greater, and cases are not uncommon in which persons drunk with ether are arrested in the streets.

Coal-Tar Derivatives Addiction.—J. Suttle Davis, of Montevallo, Ala.,⁸¹⁴_{Dec. 16, '94} reports several cases of addiction to this class of remedies. In a man of 32 years sulphonal in 20-grain (1.3 grammes) doses six times daily had caused incurable nervous deterioration. In three other cases the agent taken was acetanilid (antifebrin), 1 drachm (4 grammes) daily in the first, 42 grains (2.78 grammes) daily in the second, and 20 grains daily (1.3 grammes) in the

third, being the maximum doses taken. A weak heart, anæmia, indigestion, insomnia, constipation, and neurasthenia were conditions more or less marked in each case. Albuminuria was present in two cases, while in the third case the specific gravity was quite low. In two cases there was an almost constant perspiration with occasional prostrating night-sweats. A marked recurring cyanosis was also observed in two cases. These were the most prominent symptoms, and can very reasonably be accepted as those to be expected in similar cases. The symptoms following the withdrawal of the drugs resembled very closely those following the withdrawal of the narcotics in similar cases,—i.e., depression, insomnia, vomiting and diarrhœa. Strychnine hypodermatically, with morphine when necessary, and chloral *per rectum* at night gave the best results.

Cocaine.—Maurel, ⁵⁵_{86, 94} from experimentation, concludes that cocaine has a distinct action on the leucocytes of the blood and small vessels, the leucocytes assuming a spherical form and tending to place themselves next to the vessel-wall. Contraction of small vessels is often followed by embolism. Small doses altered the leucocytes; intra-venous injections dangerous, even in smallest doses, owing to embolism in the lungs.

[I have had under my observation a lawyer who has been a slave to cocaine-inhalation, which, in my opinion, is the least noxious method of use. In this case the inhalation was prescribed for persistent asthma three years ago. The faculties have appeared to be heightened and more head-work has been done; but slight symptoms of brain degradation and some unsteadiness of purpose, with will-paresis, have set in, the patient all the while believing himself improved.—N. K.]

DISEASES OF THE GENITO-URINARY APPARATUS IN THE FEMALE.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

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DISEASES OF THE UTERUS.

Displacements.

Mackenrodt,⁸⁵_{R. 48, H. 1, 76} after a careful study of the anatomy of the structures supporting the uterus, states that the pelvic fascia is the supporting agency which prevents displacement of the viscera. The genital organs do not simply pass through a foramen in the fascia, the edges of which hold on to the uterus and vagina by a few stout fibres; the fascia sends dense ligamentous bands into the supra-vaginal part of the cervix and the vaginal wall, and these bands support the uterus and vagina. As the upper part of the cervix is normally concave forward, anteversion and ante flexion of the uterus occur as a natural result; dissection further shows that there are no processes from the pelvic fascia to hold the body of the uterus in the well-known position, nor is it so held by the peritoneal folds. The uterus is retained in its ante flexion by gravitation and abdominal pressure from above. The perineum, Mackenrodt states,²_{May 1, 76} has only an indirect share in resisting intra-abdominal pressure. Flexions and displacements may be due to pathological changes in the ligamentous bands distributed to the cervix or to morbid changes in the essential uterine tissue itself. Thus, a bulky uterus with weak muscular walls in a roomy pelvis may become abnormally ante flexed. The special primary condition in retro flexion is relaxation of the uterus and of the ligaments of the cervix. In prolapse there is tension and atrophy of the ligaments of the cervix and vagina, always accompanied by atrophy of the muscular structures in the pelvis.

Le Dentu, of Paris,¹⁴_{Mar. 24, 76} regards the median posterior crest of the body of the uterus as a sign of retro deviation. As is known, the two surfaces of the uterus have neither the same form

(F-1)

nor the same aspect. The anterior surface is fairly regular in convexity from one side to the other; the posterior is formed of two oblique facets, directed inward and backward from each border, meeting on the median line, and thus forming a soft, but distinct, crest, beginning at the point of separation of the cervix and the body of the uterus and continuing upward for a distance varying in individual cases. It does not extend to the posterior border, —which is regularly convex in a transverse direction, as from the front backward. It is more pronounced, according to Meckel, in young persons.

In cases of retroversion or slight retroflexion, if the index finger be placed at the base of the posterior *cul-de-sac*, a crest can be felt distinctly between two plane surfaces, extending from one and one-half to three centimetres above the cervix. The discovery of this crest may be of value in the diagnosis, especially when the uterus is deformed by small fibromata and when the diseased appendages are pressed against the organ by adhesions.

Edward J. Ill, of Newark, ¹_{Oct. 6, '96}, ¹⁰⁰_{Nov.} speaks of the importance of lateral displacements of the uterus, which are generally overlooked, the patient's symptoms being attributed to other ailments. He has collected from his last year's office case-book all cases of lateral displacements except such as presented tumors, finding it present in 14.2 per cent. He draws special attention to those cases which he considers to be congenital and where the pain is referred to the elongated broad ligament. The symptoms begin early in the patient's sexual life, in severer cases progressing gradually to complete invalidism.

Retrodisplacements.

Alexander's Operation.—Clement Cleveland, of New York, ²⁷_{July, '96} considers Alexander's operation as one of the most beneficent ever devised. Those who have opposed the operation have, in his opinion, either argued against it on purely theoretical grounds or on insufficient practical experience,—the source of indifferent results. He did not feel at all at home with the operation until he had performed it fifteen times or more. That the operation is not a dangerous one is shown by the large number of reported cases and the very few deaths. Great patience and care are required to find and draw out the round ligaments, yet expert operators usually succeed in doing so in a reasonable time. The operation is indicated in retrodisplacement with prolapse of one or both ovaries, where for any reason the pessary cannot be worn, and where there is a shallow vaginal pouch, on account of the inability of such patients to retain a pessary. It is rare that the ligaments

are too frail to support the uterus; in many of his successful cases they appeared very thin and weak, but nevertheless did not yield.

In the discussion of this paper, F. H. Davenport, of Boston, stated that he regarded the field of the operation as limited. In his experience it did not always relieve the symptoms, even though the uterus were freely movable and could be easily brought into position. Ely Van de Warker, of Brooklyn, said that his experience, though considerable, was not in favor of the operation. He felt that it was unscientific, for the round ligament, by failing to give proper support to the uterus, had permitted the recurrence of retrodisplacement. H. C. Coe said that the function of the round ligament was to keep the uterus sufficiently forward so that the intra-abdominal pressure would keep the organ in the normal position. For this reason Coe did not see how the operation would be of service in prolapse, as recurrence would take place. The aim should be to pull out the ligaments sufficiently to throw the uterus past its dead centre, and then the intra-abdominal pressure would maintain the organ in its proper position. T. A. Emmet had had an opportunity to see Alexander operate a number of times, and on these occasions he had placed his finger in the vagina while the uterus was drawn forward. He had then become impressed with the uselessness of the operation, and he had on this account never performed it. With a degree of prolapse which straightened the vessels they also became larger, and this gave rise to congestion. He felt confident that it was congestion and not displacement that was the cause of the symptoms of which these patients complained. If Alexander's operation ever gave relief, he believed it was by accident simply,—in other words, the uterus had been placed in such a position that the circulation had been restored. Polk said that Alexander's operation had been before us since 1883, and yet the objections to the operation at that time were pretty much the same as those brought forward at the present time; nevertheless, some of those who had been objectors formerly had become advocates of the operation. Personally he believed that in every instance, if the operation were done in proper cases, the result would be exactly that described by Cleveland.

[This operation should have but a limited application. It should not be done where adhesions exist, whether uterine or of the appendages, as the uterus is dragged forward by the shortened ligaments and backward by the adhesions, increasing the discomfort. The ligaments are sometimes rudimentary. The writer has found them so in two cases. Two wounds are required. Infection may result in loosening of the sutures and dragging back of the

ligament, carrying infection into a groove which is subsequently difficult to reach and treat.—E. E. M.]

The permanent results from the Alexander operation are discussed by J. G. Blake, of Boston, ⁹⁹_{Apr. 25, '95}, who has received reports from operators throughout the United States and England, and has tabulated the results, aggregating, with Chadwick's figures, 1300 cases. ⁹⁹_{Apr. 25, '95} The failures did not exceed 10 per cent. of the whole number operated upon, and applied chiefly to the early cases. He also reported 53 childbirths in which the position of the uterus had been found to be unaffected by pregnancy or delivery. The result of the investigation satisfies Blake that the operation is a useful and reliable one within its limits—backward displacement without adhesions—and is almost absolutely free from danger in competent hands. Hernia and abortion are also found to be of very rare occurrence. O. Küstner, of Breslau, ³¹⁷_{Nov. 1, '95}, ⁵_{June, '95} reports 30 cases of Alexander's operation, all of which were successful, the uterus remaining permanently in its normal position. Suppuration occurred in a single instance only. The operation was performed for retroversion.

E. Kummer, of Geneva, ³¹⁷_{Nov. 14, '95}, ⁸⁶_{July, '95} has traced the after-history of 14 cases (4 of prolapse and 10 of retroflexion of the uterus) in which he performed the Alexander operation of shortening the round ligaments. He concludes that retroflexio uteri is fully and finally cured by the operation, always granting that the cases chosen for interference are those in which the uterus is free, not fixed.

According to J. Franklin Robinson, of Manchester, N. H., ⁹⁹_{Aug. 25, '95} the Alexander operation should not be attempted if the uterus is fastened in retroversion by strong adhesions or pelvic infiltrations; but in suitable cases it offers a ready and safe means of restoring the uterus to its normal condition, with a fair certainty of its remaining there permanently.

Hysteropexy.—In a paper on operations for the suspension of the retroflexed uterus, Howard A. Kelly, of Baltimore, ⁸⁵⁸_{July 1, '94}, ⁶_{Oct. 20, '94} objects to the terms "ventrofixation" and "hysteropexy" as applied to these operations, because, in his experience, some months after the operation the uterus is found not to be fixed, but, on the contrary, to be freely movable in a position of ante flexion; it appears to have no direct organic connection with the abdominal wall except by long, attenuated adhesions. Kelly suggests "suspensio uteri" as a suitable name for the operation. He considers that there are two methods by which the uterus may be efficiently suspended: First, by two ligatures of silk or silk-worm gut passed on either side through the peritoneum and subjacent tissue about two centimetres from the abdominal incision and parallel to it, and

then round each utero-ovarian ligament, respectively, when they are tied, raising the uterus into a position of ante flexion. The other method consists in passing two silk sutures through the peritoneum and subperitoneal tissue in a transverse direction, and about one and one-half centimetres from the incision. The suture is then carried through a part of the body of the uterus or its posterior surface near the fundus, and then through the peritoneum, as on the opposite side. The two ends of the suture are brought out of the incision and tied, bringing the uterus and anterior abdominal wall into close apposition. A similar suture passed immediately below the first is found quite sufficient to keep the uterus in place. In the paper referred to forty-five cases are recorded in which an operation for suspending the uterus was performed. There were no deaths.

H. R. Holmes, of Portland, Ore., ⁶¹_{Am. M., 76} also reported two cases upon which he had operated by Kelly's method. He regards the operation as very valuable in certain extreme anterior displacements of the uterus. In the discussion A. Lapthorn Smith stated that he had performed this operation twenty-six times without any death-rate and with very gratifying results. He referred to the importance of scarifying the peritoneum and anterior surface of the uterus for the purpose of favoring adhesion. He employs a permanent sterilized silk ligature in stitching the uterus to the abdominal wall. The organ is quite movable after the operation. He considers it preferable to Alexander's operation. Kelly stated that he now employs the posterior surface of the uterus instead of the ovarian ligament in suspending the uterus, because it is a little easier and quicker. The results by both methods are about the same. With an absorbable suture the uterus will only remain forward as long as the suture holds.

[It is, without question, preferable to the Alexander operation, inasmuch as there is but one incision, less dissection, and consequently less disturbance of the tissues. Should infection occur, it is more accessible. Two sutures should be used, just posterior to the fundus. In passing through the abdominal wall these sutures should not include the peritoneum; so that the peritoneal surface of the uterus should be brought in contact with the muscular tissue of the abdominal wall. The precaution should be exercised not to include too large an amount of uterine tissue. If the sutures are absorbable or not buried, a pessary should be worn for a month to prevent strain upon the band of adhesion.—E. E. M.]

Reuben Peterson, of Grand Rapids, Mich., ²⁷_{J. M., 76} treated seventeen cases of retrodisplacement of the uterus by suspending the uterus by the ovarian ligaments, as recommended by Kelly. ⁷⁶⁴_{v. 1, 76}

Intra-abdominal shortening of the round ligaments for retrodisplacements is recommended by Matthew D. Mann,^{9 451}_{Mar. 22, '96; May} who performs the operation as follows: A moderate-sized opening is made in the abdominal wall, and any adhesions that may bind down the uterus are broken up. The patient is then put in the Trendelenburg position, and a large, flat sponge is spread over the intestines. The uterus is pulled up and to one side so as to put the round ligament on the opposite side upon the stretch. The ligament is then seized with two long-handled hæmostatic forceps, the points of seizure dividing the ligament as nearly as possible into three equal portions. A needle threaded with silk-worm gut is passed through the loop nearest to the abdominal wall, and under the point where the round ligament is inserted into the uterus, so as to include a considerable quantity of uterine tissue. The loop is then tied to the uterus. A second stitch is passed through the ligament just as it leaves the abdominal wall, and then through the loop in that portion of the ligament nearest to the uterus. The ligature is tied and cut as before. The needle should penetrate the ligament so as to include about two-thirds of it, and so avoid the artery which runs just below the ligament. The same operation is repeated upon the opposite side, and the wound is closed as usual. The writer claims that this operation cannot primarily fail; that the ligaments can be shortened to any degree required. The uterus is then left in its natural position and supported by its normal ligaments. Should pregnancy occur the uterus is left free to move and to rise as may be required. There are no loops for intestines to enter, causing intestinal obstruction.

Hiram N. Vineberg, of New York,⁵⁰_{Mar. 2, '96} is of the opinion that vaginal hysteropexy is likely to supplant abdominal cœliotomy and ventrofixation, and Alexander's operation in a large number of cases, especially of retroversions and diseased adnexa. He brings out the fundus uteri through the wound in the anterior *cul-de-sac*, thus enabling him to pass the sutures by sight; in this he differs from the methods followed by Dührssen and Mackenrodt, who leave the fundus above the wound and pass the sutures by touch. He prefers the longitudinal incision as having four advantages over the transverse: (1) less hæmorrhage, (2) more room, (3) no danger of wounding the rectum, and (4) less chance of coming into contact with intestines.

[Vaginal hysteropexy will be of doubtful service in relaxed vagina. In such cases the dragging back upon the bladder adds to the discomfort.—E. E. M.]

William B. Pryor, of New York,⁵⁰_{July 20, '96} recommends a new

procedure for the treatment of adherent retroposed uteri. The vaginal *cul-de-sac* having been opened and the uterus replaced, a wad of gauze is placed in the incision, while the vagina is distended with another, but larger wad, which in turn tends to upset the uterus forward and keep it there during the healing process. As a result of the operation, the details of which should be read in the original article, the adhesions are severed and the possibly occluded tubes opened; the organ is lightened by curettage and cervix operation, one or both. At the same time, the cervix is maintained in such an elevated position that the intra-abdominal pressure must be behind the corpus, thus throwing the organ well forward. The retroversion is corrected by a dense mass of lymph about the utero-sacral ligaments. The operation leaves the corpus uteri free, does not invade the bladder space, and merely corrects errors in the relations between the pelvic viscera. All other operations substitute some other, perhaps less serious, malposition for the adherent retroversion or flexion. The author, who has used the operation in seven cases, states that it is an eminently successful one, and that there are but two objections to it: it converts a pelvic organ into an abdominal one, with fixation of the corpus uteri, and necessitates section of the abdominal wall. An excellent review of all the operations generally employed is published by John Madden, of Milwaukee. ⁶¹
Feb. 2, '95

Prolapse.

Græfe, of Halle, ³⁴_{Nov. 11, '95} believes that, in the majority of cases of prolapse, anterior or posterior colpoperineorrhaphy, combined with vaginal or ventral fixation, will bring about recovery; but where these fail, where prolapse recurs afterward, and the uterus is irreducible, there is no other resource but complete extirpation, especially if the patient has passed the menopause. In the discussion of this paper Fehling touched on the importance of thoroughly understanding the etiology of each case. In the majority of instances relaxation of the vaginal walls or atony of the vulvar walls causes the condition, and here colporrhaphy or perineorrhaphy gives good results. In other cases there is relaxation of the peritoneum of the lesser pelvis, and the uterus drags the vagina down with it. In these cases colpoperineorrhaphy alone is insufficient, and must be combined with vaginal or abdominal hysteropexy or hysterectomy.

Pozzi, of Paris, ⁹⁹⁶_{June 25, '95} declares himself a partisan of vaginal hysterectomy in complete genital prolapse, as being occasionally requisite, but necessarily always accompanied by colpectomy and perineorrhaphy. When the patient has passed the

menopause, and the accidents due the atresia following supra-vaginal amputation of the cervix need not be feared, the latter operation is also efficacious, while at the same time less serious than hysterectomy. When supplemented by perineorrhaphy it gives excellent results.

New Operations.—H. W. Freund³¹⁷ ¹¹⁷⁰_{No. 47, '98; Aug.} recommends what he considers as a new method of surgical treatment of prolapse. Four or five silver-wire sutures, drawn by a curved needle, are circularly inserted beneath the vaginal mucous membrane, being so placed as to eventually form a supporting body to the uterus, and then are tightened in order to prevent prolapse after replacement. The first wire is placed one inch from the external os, and is carried underneath the mucous membrane to its full circuit, always re-entering the puncture of exit until it reaches the first puncture, when the portio vaginalis is pushed back by an assistant, and the wire drawn tight, twisted, and allowed to sink beneath the mucous membrane. Other sutures are introduced three-fourths of an inch apart until the vagina is re-inverted and the uterus is replaced. The operation can be done with only local anæsthesia, and is of service only in cases where the patient has passed the menopause and is not liable to pregnancy. H. Gärtig, of Breslau,³¹⁷ ¹¹⁷⁰_{June 1, '98} in reporting seven operations for prolapsus by Freund's method performed by Brunn, calls attention to the fact that the procedure is not a new one, a case having been reported by Schramm,³¹⁷ ¹¹⁷⁰_{Nov. 10, '94} who referred to it as simply the revival of an old operation devised by Giambattista Bellini, of Florence, in 1835. Gärtig is not very enthusiastic in its favor, as only two patients remained cured at the expiration of a year. The technique is extremely simple, and no bad results followed in any instance, except transient œdema. While the simplicity and harmlessness of the operation must be admitted, a permanent cure cannot be insured.

Otto Holst⁶ ¹¹⁷⁰_{June 15, '98} calls attention to Westermarck's operation, which he has used with permanent success in twenty-two cases which had proved rebellious to other methods. The novelty in this method lies in the operation of colporrhaphy being *lateral*. Westermarck's reason for this modification of operating is that it is the strong connective tissue in the broad ligaments which keeps the vagina *in situ* even when the perineum is imperfect, and not the connective tissue found between it and the bladder anteriorly and the rectum posteriorly. He compares the relation between the uterus and the vagina to a funnel hanging down the neck of a bottle, and contends that, the uterine ligaments—i.e., the upper part of the broad ligaments, the round ligaments, and the sacro-

uterine ligaments—being too feeble to keep the uterus in position, it is the lower part of the broad ligaments and their strong connective tissue which keep it *in situ*.

Ida Schmid⁹⁵ gives the statistics of operation for prolapse at Wyder's clinic, in Zurich, from 1888 to 1891. Of 229 cases operated on, recurrence necessitated a second operation in 8 cases. Anterior colporrhaphy was performed in almost every instance, six times being the only operation; generally, however, cuneiform excision or amputation of the cervix was combined with it. Schröder's operation was performed when there was ulceration of the cervix with catarrh, or occasionally Emmet's operation. There were three deaths,—one, from tetanus, three weeks after operation; a second, who had an epileptic brother and who showed signs of excitement the evening before operation, was taken next day with delirium, and died some weeks after from acute paralytic dementia. The third patient, infected during operation, left the hospital and died at her home from the results. As to the ultimate results, only 128 could be followed long enough to warrant definite conclusions. Of these, in 72 cases the results are known, there being 14 relapses, 7 of the women wearing pessaries; 3 cases were failures, 2 being very severe and the other having a uterine tumor.

Hysteropexy.—The aim of hysteropexy in prolapse is also to fix the uterus firmly to the abdomen and maintain it in this position; but, as G. B. Segale, of Genoa,⁹¹ remarks, if it is rational to combat the prolapse by this operation it is no less rational to treat at the same time the causes which have produced the prolapse. These causes are multiple: increase in the size of the viscera, relaxation of the vagina and suspensory ligaments, and diminution or disappearance of perineal resistance. Before proceeding to hysteropexy the operator should first practice such preliminary measures as will restore the parts to their normal condition,—such as amputation of the hypertrophied cervix, simple or double colporrhaphy, or simple perineorrhaphy, as the case may require. Hysteropexy may then be performed, and, in order to insure permanent results, Segale advises fixing the uterus directly to the walls of the abdomen. He brings the anterior wall of the uterus into apposition with the parietal peritoneum at the point of incision over the symphysis pubis, and, incising the peritoneum longitudinally, separates it and proceeds to suture, taking care that the points include the entire thickness of the abdominal wall and that they solidly fix the uterus through its anterior wall. Three sutures with No. 3 or 4 catgut are usually sufficient.

Fowler, of New York,¹ proposes a new method of hys-

terorrhaphy by ventral fixation by means of the detached and replaced urachus. As is well known, a prominent fold of peritoneum extends from the summit of the bladder to the umbilicus, and incloses the urachus and the obliterated hypogastric arteries. The urachus itself consists of a strong, fibro-muscular, impervious cord, which, at its central portion, averages eight millimetres in circumference, and represents that portion of the allantoic vesicle which remains after the formation of the bladder. It is narrowest at the umbilicus and broadest at its attachment to the bladder. The procedure is carried out as follows: The usual median abdominal incision is made, and the urachus identified as it passes close to the edge of the peritoneal incision upon the right side. Its upper extremity is cut directly across, and the cord, together with a ribbon-shaped strip of the peritoneum about one centimetre wide, is detached by dissecting it loose with the scissors down to the level of the lower angle of the abdominal wound. The uterus is then brought up into position and a Cleveland ligature-carrier passed beneath its serous and subserous connective-tissue investment at a point upon the posterior aspect of the fundus. The point of the ligature-carrier emerges about a centimetre from the place of entrance, its jaws are opened and made to grasp the free end of the ribbon of peritoneum containing the urachus, and this is drawn through the opening made by the ligature-carrier by tightening its jaws and withdrawing the latter. The urachus is then replaced and secured in position by being included in the layer of sutures which close the peritoneal opening. Care should be taken to avoid leaving an open space just above the fundus and between the abdominal wall and the detached urachus. The urachus should only be detached in a downward direction sufficiently far to serve the purpose of a sling for the uterus, and the lowest suture in the abdominal wall should be passed through the urachus close to the point where the latter leaves the uterus. The whole procedure can be accomplished in a very short space of time.

A case of sudden death eleven days after hysteropexy is recorded by Talley, of Philadelphia.¹¹⁹² The uterus and ovaries were dotted over with miliary tubercles. The patient did very well until the eleventh day, when she suddenly had spasms, became cyanosed, with Cheyne-Stokes respiration, and died.

Mackenrodt³¹⁷ removed the uterus from a woman who had undergone hysteropexy for prolapse about a year previously. Dragging and tearing pains were felt constantly, being referred to the site of adhesion of the fundus to the parietes. The patient became more of an invalid than she was before the operation.

A. Goubaroff reports from the clinic of Dorpat³ a case

of difficult labor due to an anterior hysteropexy, which caused such strong adhesions as to render Cæsarian section necessary. The case confirms the assertions of Greig Smith, that where a serous surface is brought in contact with the wound itself the adhesions formed are particularly solid and resistant. The patient had undergone the operation of ventrofixation some four years previously.

E. C. Dudley ²⁷_{Dec., '94,} ¹⁶²_{Feb. 25, '95} describes a new operation for prolapse which he terms lateral elytrorrhaphy. The operation is performed with the patient in the Sims position and with the vagina exposed by means of a Sims speculum, the blade of which had been perforated at its extreme end. Before the speculum is introduced the cervix is attached to the end of its blade by means of a temporary suture, which is passed through the posterior lip of the cervix and through the perforation in the speculum and tied. This enables the operator to dispense with the sponge-probang described by Emmet, and which is objectionable since it obstructs the operator. This suture should be removed at the end of the operation. When the cervix is thus held in its normal location by the speculum, the space anterior to the uterus is so increased that that organ readily falls forward into a position of decided anteversion. The first step in the operation proper is to denude two semicircular strips in the vaginal wall close to the uterus and on either side of it about one-third of an inch wide, their concavity being toward the cervix. Each denuded surface is then closed upon itself by means of silk-worm-gut sutures. The folding of the denuded surfaces upon themselves lifts the cervix bodily upward and backward. Next, two strips about one-quarter of an inch wide are denuded, extending along each lateral sulcus of the vagina from the lower point of the former denudation to the vaginal outlet, terminating on either side of the orifice of the urethra. The lateral edges of each of these denuded surfaces are now brought together by means of sutures passed obliquely across the denuded strip. One side of each of these denuded strips is adjacent to the anterior vaginal wall and the other side is adjacent to the posterior vaginal wall. Upon tying these obliquely-placed sutures the redundant margin of the wound, produced by sliding the anterior wall upon the posterior, is disposed of. The effect of this method of suturing, when applied to both sides of the vagina, is to slide the anterior vaginal wall upward and backward on the posterior vaginal wall and fix it there. The cervix uteri, being in the anterior vaginal wall, must participate in the upward and backward movement. The author has performed the operation for three years with permanently good results. The operation restores the upper extremity of the vagina and of the anterior vaginal

wall to its normal location and direction, and thus the cervix uteri is forced backward to its normal location near the hollow of the sacrum and the remainder of the uterus falls into its normal anterior position.

[Many cases of apparent prolapsus of the uterus are the result of supra-vaginal elongation of the cervix. Plastic operations in these cases are usually ineffective. A sufficient portion of the cervix cannot be amputated to give the necessary relief. The method suggested by Baldy will be found of service. It consists in plastic operations upon the vagina and perineum, the opening of the abdomen, amputation of the body of the uterus at the junction of the cervix, covering over the stump with peritoneum, and then the introduction of a ligature from the upper part of the broad ligament on either side to the side of the stump. This tied, lifts the stump up to a higher level, and thus elongates the vagina, overcoming the subsequent tendency to displacement. Noble has modified this operation by stitching the stump fast to the anterior abdominal wall.—E. E. M.]

Laroyenne³_{Aug. 14, '96} describes his method of treating ante flexion by anterior abdominal hysteropexy. He dilates the uterus with a Hegar dilator and introduces a large hysterometer, by means of which an assistant pushes the uterus against the abdominal wall in such a way that the surgeon, who makes his incision at this moment, finds himself at once in contact with the anterior uterine wall, making it unnecessary to search for it with the hand. The incision, which is only four or five centimetres long, is at once closed by the uterus, which is fixed at this level by two or three needles passed through the aponeurotic layer and the peritoneum and through the anterior surface of the uterus. They are then threaded with Florence hair, drawn out, and tied. This operation is benign and not aggravated by the destruction of membranous adhesions. Removal of one or both appendages is sometimes necessary, and naturally complicates the operation.

Pessaries.—Andrew F. Currier, of New York,⁴⁵¹_{July, '96} concludes that, in lateral displacements, pessaries are seldom indicated, and, if required at all, the indication would be better met by a cotton tampon than by any form of pessary which is now in use. In anterior displacements they are of little value, most of the varieties now or until recently employed being harmful rather than helpful. In prolapsus uteri most of the pessaries now used are clumsy and irritating. The indications are more satisfactorily met by surgical procedures than by mechanical supports. In posterior displacements pessaries often serve a very useful purpose if properly adjusted and removed sufficiently often for purposes of cleanliness.

They are, however, palliative and seldom entirely curative. The best is the Albert Smith or a modification; but radical cures are most effectually obtained by surgical measures.

Considering the injurious effects of pessaries, Denslow Lewis, of Chicago, ²³_{Dec., '94} instances 36 cases of vesico-vaginal fistula, 21 cases of perforation of the bladder, 1 case of uretero-vaginal fistula, 1 case of perforation of the urethra, 24 cases of perforation of the rectum, 11 cases of perforation of the rectum and bladder, 2 cases of perforation of Douglas's *cul-de-sac*, and 5 cases of forcing of a pessary by pressure into the tissues surrounding the vagina.

R. B. Elderdice, of McKnightstown, Pa., ¹⁷⁶_{Dec., '94} describes a case of prolapse in which the patient procured a uterine supporter having a hard-rubber stem-ring pessary, about one and three-fourths to two inches in size. This she applied herself and wore constantly, she states, with the greatest of comfort and relief, for three months, when the womb slid through the ring, and, from her efforts to return it and from congestion and enlargement, became very tightly constricted. It was necessary to break the ring with a pair of wire-cutting forceps.

[The writer saw a case of prolapsus of the uterus in which a retroversion pessary had been worn for twenty-six years without removal. It was imbedded in the vagina for two-thirds its length. Only a small portion of the anterior loop projected. The vaginal tissues were nearly an inch in thickness over the posterior bar. Instead of cutting through this to remove the pessary, the pessary was drawn down upon one side, cut in two with a pair of bone-forceps, and a similar course pursued on the opposite side. The posterior half was then gently turned out of its track, leaving the uterus supported by the dense adhesions.—E. E. M.]

Endometritis.

Etiology and Pathology.—Winckel, of Munich, ⁶_{Jan. 29, '96} presented a report to the Obstetrical Congress at Vienna on endometritis, of which he distinguishes two groups: (1) the simple forms resulting from the action of poisonous substances, general infection of the system or abortion, and the so-called exfoliative endometritis; and (2) the purulent and bacterial forms caused by schizomycetes and protozoa (gonococcic and tuberculous varieties), by streptococci and staphylococci, saprophytes, diphtheria, and syphilis. Simple metritis arises from the return of blood from the uterus being impeded by excessive congestion, which may occur even in childhood, in consequence of unsuitable clothing, imperfect ablution of the genitals, obstinate constipation, chlorosis, anæmia, and leukæmia; whereas, after the period of puberty, menstrual dis-

turbances, ectopia and neoplasmata of the uterus, and diseases of the ovary are to be taken into consideration. Hæmorrhagic endometritis is a not uncommon sequel of burns, probably in consequence of obstruction of the vessels. Poisoning produces fatty degeneration of the small arteries and extravasation of blood into the mucous membrane; portions of the membranes of the ovum left in the uterus give rise to endometritis decidualis polyposa, which, when not entirely removed, may, in the event of conception taking place, cause habitual abortion. In the purulent form the gonococcus most frequently attacks the urethra, then the cervix and oviducts, and rarely the vagina and vulva. From the cervix it both makes its way through the uterine wall to the peritoneum and ascends to the mucous membrane of the uterus. There is no immunity against this coccus; it occurs at every age and retains its virulence for years. Streptococcus pyogenes causes puerperal endometritis and attacks all parts of the mucous membrane of the womb, puerperal and non-puerperal, migrates through the wall of the uterus and oviducts to the peritoneum, and shows much variation according to the place of the inoculation, the number of the cocci, and the resistance of the organism. Primiparæ and women exhausted by hæmorrhage and protracted labor are specially disposed to be infected by this coccus.

Döderlein³¹⁷_{No. 28, 76} states that the pyogenic form is most common in puerperæ, and is the origin of the virulent general infection sometimes observed. The streptococcus pyogenes is nearly always the active agent, though staphylococci, gonococci, and the bacterium coli commune may be etiological factors. The specific micro-organisms of so-called sapræmic endometritis have not yet been isolated.

Bumm, of Basel,³¹⁷_{No. 28, 76} examined 29 cases of endometritis of the body, and he could obtain no trace of bacteria either by microscopical examination of the secretion and tissues or by cultivation experiments. Of the cases, 16 were of the hyperplastic glandular variety, 10 were the fungous endometritis accompanying fibromyoma, and 3 were of catarrhal endometritis. On the other hand, he found micro-organisms in 7 cases of hyperplasia of the endometrium, in 6 cases of chronic catarrhal endometritis, and in 2 cases of endometritis in fibromyoma. He therefore concludes that in chronic endometritis of the body no bacteria can be found either in the secretion or in the tissues of the diseased mucous membrane. The disease of the mucous membrane is not, therefore, kept up by the action of bacteria in this region. In a small proportion of cases, however, various bacilli and cocci, among which are also found some pyogenic cocci, are found in the secre-

tion, but not in the tissues. They are to be looked upon usually as mere accidental accompaniments of endometritis of the body. It is possible that, owing to the immigration of pyogenic microbes into the uterine cavity, the secretion from the diseased mucous membrane may become purulent. The author insists upon the fact, however, that the view that chronic endometritis of the body has no essential relationship to bacteria does not exclude the fact that disease of the mucous membrane arises from acute septic or gonorrhœal infection, or may remain as a result of such infection.

Wertheim³¹⁷_{NOV. 21, '96} states that, since Schauta has adopted in certain cases extirpation of the uterus along with the appendages instead of the simple appendage operation, he, as his assistant, has had exceptional opportunities of examining the uterus both before and after extirpation. On the evidence obtained by macroscopical, microscopical, and bacteriological examination in eighteen such cases, he formulates the view that gonorrhœa of the uterus produces in all cases an inflammation of the mucous membrane, which we may designate as an interstitial endometritis with suppurative catarrh, and that in a not inconsiderable number of cases the chronic course leads to increase in the number of glands,—that is, to a glandular endometritis. Along with the changes in the mucous membrane there occur in many cases inflammatory changes in the muscular tissue, which are sometimes characterized by inflammatory infiltration of the connective tissue, sometimes by hyperplasia of the walls of the blood-vessels, and which finally lead to an hyperplasia of the connective tissue at the expense of the muscular elements. In the inflamed mucosa the gonococcus is in many cases demonstrable in greater or less quantity; in many cases, however, it is not to be detected either by the microscope or by culture; the deeper the layer of mucosa, the more difficult is it to prove the presence of the gonococcus. The presence of the latter in the inflammatory infiltration of the muscular tissue is probable, but it has not yet been proved. The puerperium holds an exceptional position among the conditions producing injurious consequences, inasmuch as it very frequently leads to an extension of the gonorrhœal invasion of the uterine cavity, previously unaffected. The pathological changes which result from gonorrhœa of the uterus are not all, however, to be summed up in the term endometritis.

Some cases of fetid endometritis in aged women may, according to Maurange,¹¹⁵³_{JAN. 21, '95; Mar. 15} be due to recurrence of simple endometritis of earlier life, or it may in others be looked upon as the result of a necrotic process accompanying the elimination of

fibromyomata from the uterus. It appears from five to fourteen years after the menopause, and attacks women who have borne children rather than nulliparæ. The history and symptoms of a case may be summarized as follows: At an indefinite period after the menopause a more or less abundant discharge appears; this is at first intermittent. The fluid is sometimes thick and purulent or pinkish in color, and, in exceptional cases, of the consistence and appearance of blood; it is always extremely offensive. In addition there may be vomiting, rapid emaciation, anxious and icteric facies, much like that observed in the latest stages of cancer. There may be vague pains, somewhat like those observed in other uterine disorders. On examination, signs of considerable vaginal irritation will be found, the cervix healthy, the uterus slightly enlarged, but quite mobile; passage of the sound gives pain; on withdrawal of the instrument a small amount of sanguineous pus escapes from the uterus, which is very fetid. The mucous membrane is turgid and ulcerated in parts, and easily detached by the curette. Microscopically the disease does not differ essentially from chronic endometritis. It is rebellious to treatment. A strong application of glycerole of carbolic acid to the uterine interior is frequently beneficial, but thorough and deep curetting is the surest method of cure.

Diagnosis.—The differential diagnosis between a catarrh limited to the cervix and a combination of corporeal and cervical catarrh can only be definitely made by microscopical examination. According to Van Tussenbroek and de Leon⁹⁵ ⁹⁹ the following points will prove of value: (1) a thin, purulent discharge points to catarrh of the corporeal endometrium; (2) cervical catarrhs seldom occur in multiparæ; (3) when reflex symptoms are prominent they point to a pathological condition of the mucosa of the uterine body; (4) cervical catarrhs are rare in virgins, the combination of cervical and corporeal catarrhs still more so; (5) true endometritis occurs in virgins more rarely than pseudo-endometritis,—occasionally it is dependent upon previous infectious diseases; (6) the two forms may occur together, in which case they usually follow subinvolution or abortion, where at the same time disturbances of the circulation and infection take place.

Bumm,³ ^{June 15, '96} has made use of endoscopy in studying endometritis, and finds that the technique is not difficult. Having acquired a certain amount of skill in examining the normal mucous membrane, he was able easily to diagnose fungous endometritis, carcinoma, and small tumors of the fundus. Metroscopy has but one inconvenience, that the uterus bleeds readily. It is therefore necessary to have sounds wrapped in cotton at hand to cleanse the

cavity and remove the blood. Certain preliminary precautions must also be taken, and the uterine secretions carefully examined to ascertain if there be gonorrhœa. He observed a case of this kind in which bacteriological and microscopical examination had not been made before practicing endoscopy, and which terminated in blennorrhagic pyosalpinx, necessitating operation.

[It is certainly doubtful whether the examination of the uterus by the endoscope affords information that justifies the danger of carrying infection to the uterine cavity.—E. E. M.]

Cervical endometritis, according to Carl Ruge, ⁸¹⁷_{Dec. 24, '90}, ⁸⁹⁰_{Sept.} exhibits especially anomalies of secretion, together with reddening and swelling of the mucosa. Instead of discharge there may come on, with gradual narrowing of the os externum, retention of secretion and a funnel-shaped widening of the canal. The external orifice is not narrow congenitally; the contraction is acquired. In consequence of the retention there results smoothness, with atrophy of the mucous membrane. In consequence of the anomalies of secretion, there are produced bands in the mucous membrane, distension of mucous crypts, retention-cysts, and follicular polypi.

Treatment.—Paul F. Mundé, of New York, ²¹⁴⁰_{Nov. 15, '90} states that the treatment employed by him in 297 cases at Mt. Sinai Hospital consisted of dilatation and curettage of the uterine cavity, followed by thorough application to the endometrium of 50-per-cent. solution of chloride of zinc in the worst cases, and of a solution of iodized phenol in milder cases. A sterilized drain was then inserted through the internal os, the patient put to bed, and all precautions taken against inflammatory reaction. A repetition of the cauterization with milder solution, if thought best, usually resulted in a permanent cure in the course of two or three weeks. There were 197 cures, 94 cases of improvement out of 297 operations, only 6 being mentioned as discharged unimproved. The best hope for a permanent cure of chronic endometritis would result from impregnation and normal delivery. Regarding chronic endometritis, of which he has seen a good deal, A. Jacobi, of New York, ⁵⁹_{Oct. 15, '90} states that he has given up its treatment by chloride of zinc because of the tendency of this agent to produce cicatrization of the surface. In parametritis he has been able to do a good deal by bichloride of mercury internally, $\frac{1}{4}$ grain a day in divided doses, kept up with intervals for perhaps six weeks. If he wish a speedier effect, he changes from bichloride of mercury to iodide of potassium weekly. This treatment certainly does good.

In acute catarrhal endometritis, A. H. Goelet, of New York, ²⁷_{Sept., '90} considers electricity an effective remedy, faradization and the negative pole of the galvanic current fulfilling the re-

glands dipping down into the muscularis, early recurrence is apt to follow the most vigorous scraping unless the raw surface is thoroughly cauterized at once. But, since these cases cannot be distinguished clinically from others, it is safer to cauterize in every instance. In every case in which liquor ferri was applied after curetting, an examination of the specimens showed that the regeneration of the epithelium was delayed. Moreover, when islands of diseased mucosa are left the application has the effect of destroying them. Attention is called to the fact that there is no analogy between the regeneration of the endometrium after curettage and the physiological process which follows menstruation.

Bossi ⁵⁰⁵_{Feb. 2, '95}, ²_{Mar. 2, '95} endeavored to find, approximately, the minimum time that the uterine mucosa takes to reproduce itself so as to be physiologically active after curetting. By direct examination of the uterus in three cases where hysterectomy had been performed twenty-five, twenty-seven, and fifteen days, respectively, after a previous curetting, he was able to affirm that in each case the mucosa was completely reproduced; so that from these three cases he arrives at fifteen days as a minimum limit.

Pichevin ⁴⁸_{May, '95} states that the untoward results from curetting that have been recorded may be enumerated as follows: 1. The production of abortion from the untimely introduction of the curette into the pregnant uterus. 2. Serious after-effects, and even death, from want of observance of strict antiseptic principles. 3. The rupture of a collection of purulent matter encysted in the immediate neighborhood of the uterus,—pyosalpinx, for instance. Should such an accident be thought to have occurred, he advises either immediate laparotomy or vaginal hysterectomy. 4. In very rare cases uterine atresia has been produced by or has followed curetting. 5. The most frequent accident has been the perforation of the uterus by the curette. The consequences of this accident are generally considered as insignificant, but Raffay, of Paris, ²⁰⁰⁰_{'95} reports a case which ended in death.

[The writer has seen the uterus punctured in a number of cases, and in none of them have any abnormal symptoms resulted.—E. E. M.]

Auvard, of Paris, ²³⁶_{Sept. 22, '94} states that the condition of the uterus may be such as to render perforation extremely easy, and even that the curette may merely discover a perforation already practically made. Lawson Tait ⁶_{Aug. 10, '95} relates an interesting case of endometric ulcerative epithelioma which fully bears out this view. He had just completed the curettage when the curette went through the anterior wall of the uterus so thoroughly that the operator could feel its point through the abdominal wall. The patient re-

covered easily, and for nine months remained quite well. Having then resorted to hysterectomy, he found, at the base of one of the nodules on the anterior wall, where it was of almost paper thickness, an unclosed rent one-half an inch across, the edges of which, except at the lower end, had healed.

Landau, of Berlin, ²²_{Dec. 5, '94} in a discussion, argued that the greatest danger of the curette does not lie in perforating the walls of the uterus, but in salpingitis, the excitation of peristaltic movements, and the forcing of material into the peritoneum. This danger has been undervalued. The worst procedure that can be imagined in this connection is to follow curetting by injection.

Monod ⁶¹_{June 16, '96} reports a case in which curetting of the uterus was followed by appendicitis without general peritonitis. Albert Crickx ²¹⁹_{May 30, '96} reports four cases of rupture of the uterus, in the service of Lavisé, out of one hundred cases of curettage.

Sordes, of Paris, ¹⁸⁸_{Sept. 1, '96} recommends the treatment of beginning endometritis by means of medicated steam. He uses resorcin at $\frac{1}{2}$ 0, and varying in temperature from 40° to 60° C. (104° to 140° F.). But slight dilatation of the cervical canal is required, and all accidents are thus avoided. The vapor acts first upon the pathological inflammatory or microbial productions of the uterine mucous membrane, causing them to atrophy and the mucous membrane to become normal. The exudations become coagulated and are excreted by means of contractions, causing a mild form of colic. The vapor also passes into the tubes and peritoneal cavity and renders them aseptic.

Laceration of the Cervix.

Paul F. Mundé, of New York, ⁵⁹_{Oct. 19, '96} stated before the New York Academy of Medicine that at the Mount Sinai Hospital, during the past twelve years, the most common disease of the uterus was laceration of the cervix,—five hundred and eighteen cases.

Penrose, of Philadelphia, ¹¹²_{June, '96} insists upon the importance of diagnosing as early as possible between a bad laceration of the cervix uteri with erosion and beginning cancer of the cervix, which in practically all cases occurs in an old laceration, as shown by statistics. Cancer of the cervix is a disease of child-bearing women, and statistics also show that the average number of children per woman with cancer of the cervix is five,—an unusually large average productivity. This forcibly suggests that all except the slightest lacerations of the cervix uteri should be closed, so that when the woman reaches the menopause, the age of the greatest liability to cancer, the cervix may not present a spot of

least vital resistance favorable for the development of this disease. The author states that there are two ways by which the early diagnosis may be made. If with local treatment, as puncture, tincture of iodine, glycerin, and douches, the condition improves and the suspicious appearance disappears, the disease is not beginning cancer. The second test is microscopical examination of a portion of excised tissue. The suspected tissue should be hooked up with a tenaculum and a wedge-shaped piece cut out with curved scissors. This is practically painless and can be done without ether. The author has in this way, on several occasions, diagnosed cancer in the very earliest stages.

Sinclair, ⁹⁰_{May, '96} while recognizing the importance of the early recognition of cancer of the cervix uteri, calls attention to the unsatisfactory result of many microscopical examinations of bits of excised tissue. The want of a clinical sign which can be recognized by the general practitioner has long been felt, and such a sign is offered, he thinks, by the greater friability of the tissues in malignant disease. If the suspected area is exposed through a speculum and is scraped with a sharp spoon it will simply bleed if non-malignant, but if cancerous the soft, cheesy nature of the diseased tissue will be readily recognized.

Treatment.—Regarding the results to be expected from operative measures, Willis E. Ford, of Utica, ¹_{Aug. 3, '96} maintains that a nervous disorder is improved by uterine trachelorrhaphy only by virtue of the beneficial action of the operation on the general health. He has been able to follow 136 of his patients for a considerable time after the trachelorrhaphy; 60 of these had not presented any unusual nervous symptoms and the operation had been done for ill health and pelvic distress. All of these had recovered satisfactorily. The 76 other patients had been decidedly neurasthenic and had deep lacerations and large uteri; 49 of these had been relieved of their nervous symptoms within a year after the operation, but the others had remained obstinately neurasthenic. In the discussion, Clement Cleveland, of New York, said that one frequent cause of failure to relieve reflex nervous disturbance was neglect to remove the cystic degeneration in the anterior lip.

In the 518 cases alluded to before, Mundé, of New York, ⁵⁹_{Oct. 19, '96} performed Emmet's operation in 342 cases, with 316 recoveries. In 160 cases an operation was not considered necessary, the symptoms being relieved by the sharp curette, iodized phenol, and nitric acid.

J. Duncan Emmet, of New York, ²⁷_{Apr., '96}, ⁸⁰_{May 15} lays stress upon an important point,—viz., that the operation should be performed

with the patient in Sims's position. The first step is to fix the cervix by a tenaculum stuck into the upper half of the lower lip of the tear. It is an advantage to begin incising at the more dependent or lower half of the laceration, because the operator thus has a clear field, free from the blood which would constantly obscure it were the upper angle first attacked. Gauging the width of the proposed canal, which should rarely exceed one-third of an inch, the operator makes his first incision, with scissors, at the inner edge of the lower lip of the laceration and at a sufficient distance from the middle line to leave an undenuded strip of mucous membrane equal to half the width of the canal. The direction of this cut should be parallel with the trend of the canal and should reach to the bottom of the laceration. The surgeon then works his way toward the angle, finding and removing all morbidly dense tissue by cutting around and under it, as in coring out a corn or wart. All of the morbid tissue should be extirpated. If any of this tissue be left, the patients will not be cured of the symptoms for which the original operation was performed. None should be left for absorption; in a few cases where, from the great depth and extent of the laceration, extending above the internal os, Emmet left some of this tissue at the bottom of the excavated angles, with the expectation of absorption, he was obliged to resort to amputation before a cure was effected. When it is demonstrable by the sense of touch (as with the thumb and forefinger or with an instrument in the canal in place of the latter) that the canal on both sides is free of hard tissue, and when we are able to remove such tissue completely from the body of the cervix, then, no matter how extensive or how deep the incision, Emmet's operation is indicated. When there is hard tissue behind the canal, or when we find that we cannot remove this product completely from the rest of the cervix with any hope of introducing our sutures properly in the confined space of our excavation, then is amputation indicated.

Fibroma of the Uterus.

Pathology.—Kleinwächter³⁵⁴ states that the researches of Rösger on the arrangement and development of the muscular tissue of the uterus confirm his own theory, published ten years ago, regarding the development of fibroids. The embryonic cells of the united Müller's duct are the common origin of the walls of the uterine vessels and of the muscle-cells of the uterine walls, and the development of these two elements proceeds simultaneously. The action of the muscular fibres of the uterine walls is directly designed to influence the blood-supply. Myomata are

originally developed from the muscular coat of uterine arteries,—a change not difficult to understand when the close relation between the muscle-cells of the vessels and those of the uterine walls is considered.

Fabricius, of Vienna,³³⁶_{Sept. 21, '96} studied the condition of the tubes in 42 cases of myoma. He found these organs normal in 17; in 2 there was unilateral catarrh. In all of the remaining 23 cases there was bilateral tubal disease, beginning with salpingitis of the mildest form and reaching the most severe varieties of interstitial salpingitis, pyosalpinx, follicular salpingitis, and hydrosalpinx. The size of the tumor did not appear to exert any special influence; with the very smallest uterine tumors the author found the greatest alterations in the tubes, both being invariably affected. The condition observed in one tube was always met with in the other, whether endosalpingitis, salpingitis follicularis, or pyosalpinx. The conditions observed, especially with regard to the frequency of tubal disease, clearly explain the fact that, in operations for myoma, tubal complications are so often met with.

Sequelæ.—O. Laurent¹⁵⁴_{Dec. 1, '94}, ¹⁴⁷_{Apr., '96} states that the study of many published cases of uterine sarcomata reveals an important fact: the relatively frequent co-existence of uterine fibroids and uterine sarcomata. In some cases we find nodules presenting all the histological characteristics of fibromyomata existing beside one or more sarcomatous tumors. In others nodules are partly fibromatous and partly sarcomatous, while the histological elements of the two tumors remain quite distinct. In still others fibromatous cells seem to be passing into a sarcomatous condition. These observations enable us to establish the following subdivisions: (1) pure fibroids, (2) pure sarcomata, (3) co-existing fibroids and sarcomata, (4) tumors partly sarcomatous and partly fibromatous, (5) fibroids becoming sarcomatous, (6) sarcomata succeeding extirpated fibroids. A primitive sarcoma may originate in the connective tissue or in the vascular walls; in sarcomata of fibromatous origin, on the contrary, the cells of the primitive tumor are in the process of sarcomatous evolution. Although, in many cases, the co-existence of these two kinds of tumors may be a mere coincidence, in others the transformation cannot be mistaken. Certain fibroids of vascular origin develop at the expense of the irritated walls of the blood-vessels, and certain sarcomata arise in the same way. Kleinschmidt describes a case of angiosarcoma of the cervix in which the large, fusiform cells were parallel to the blood-vessels, and von Kahlden reports one showing the cells developed around the blood-vessels, thus forming small, confluent tumors. Virchow, Hégar, Leopold, and Chrobak admit the sarcomatous transforma-

tion of fibroids. Gusserow believes that sarcomata of the uterine muscles generally arise from sarcomatous degeneration of uterine myomata, although primitive sarcomatous degeneration is not unknown. In one case of uterine fibromyoma of ten years' standing, removed by Martin, Ritter reports sarcomatous proliferation of the intestinal parts. The appearance of sarcoma on the site of an extirpated fibroid is not infrequent, and, at the last meeting of the Society of Surgery (Brussels) two cases were reported in which sarcoma appeared in patients who had formerly suffered from fibroids in other parts of the body. These considerations indicate that prognosis in these cases should be reserved, even when the histological and clinical diagnosis is that of a benign affection.

M. Hofmeier ³⁴_{Sept. 25, '94} has made a careful study of 213 personal cases of uterine myoma with a view of determining the influence of these growths upon conception, pregnancy, and parturition, and has formed conclusions differing in several points from those generally accepted. With regard to the frequency of myoma the author agrees with others, as follows: 25 per cent. of the women are unmarried and 75 per cent. married, from 25 to 30 per cent. of the latter being sterile. In by far the greater majority of cases the myomata are quite, or almost entirely, without influence in determining sterility, and have no effect whatever upon fertility, even in the sense of diminishing it. The author also considers that the danger of the pregnancy when a myoma exists is greatly overestimated; the danger of premature labor, in particular, is no greater than in ordinary pregnancies, while fears as to the effect of parturition have no serious foundation. With patience, careful and strict antisepsis during parturition, and expectant treatment in the third period, these fears will prove exaggerated. The author does not consider the period immediately after the birth as the best time for operative measures for the removal of the myoma, but advises that they be resorted to several weeks or months later.

Treatment.—At the last International Congress, Martin, of Berlin, affirmed that total extirpation of the uterus would soon be accepted as one of the principal operations for the surgical treatment of uterine fibromata. Obalinsky ³⁸²_{Dec., '94} ⁴⁹_{May, '95} makes an energetic protest against this view, believing that the ablation of the uterus, vaginal or by laparotomy, is a proceeding far too commonly adopted. From a review of his own cases (13), of others in the gynæcological clinic at Krakow (14), others of Matlakowski (10), and available pathological preparations (18), he believes that in 40 out of these 55 cases, or 72.7 per cent., the tumor having lain

in a capsule from which it was easily detachable, the uterus could have been preserved.

An editorial in the *Therapeutic Gazette*, after a review of the four main operations resorted to for the removal of the uterus, states that the results obtained by these different methods by large operators are all excellent, and vary astonishingly little. Martin's series of 26 cases presented only 1 death,—a mortality of 3.8 per cent.; Ott, 24 cases with 1 death; Bantock, 23 cases with 1 death; Carle, 20 cases with no death; Zweifel, 93 cases with 3 deaths; Leopold reports 20 cases with no death, and mentions Brennecke's report of 19 cases with no death, making, in all, 225 cases with 6 deaths,—a mortality of 2.6 per cent. In Europe, five years ago, the mortality shown by the same class of operators was 25 per cent., while now they show a mortality of less than 8 per cent. In the United States, also, where the tendency is toward the operations of complete hysterectomy and supra-vaginal hysterectomy, 281 united cases showed, even three years ago, but 22 deaths,—a mortality of but 7.8 per cent.

Gordon, of New York, ^{June 1, 1898} at a meeting of the American Gynæcological Society, expressed the opinion that, when a woman finds herself an invalid from a fibroid uterus to the extent of seeking the advice of a surgeon, unless such tumor could be successfully and easily removed *per vaginam* either by enucleation or by morcellation, conservative surgery demanded hysterectomy. In his experience he had found the abdominal method the preferable one. W. M. Polk, of New York, stated that the mortality-rate at the present time from total hysterectomy for fibroids might fairly be stated to be only 1 or 2 per cent. if the operation were confined to suitable cases. He felt that, in operating in these cases of uterine fibroids, the infra-pubic route had been too much neglected, and he believed that in this direction lay the possibility of obtaining successful results at much less cost to the patient. Baldy, of Philadelphia, argued that by total hysterectomy the patients were relieved of the symptoms due to the fibroids, although they undoubtedly suffered from the less important symptoms of the menopause. If these tumors were allowed to proceed, many cases would soon become inoperable.

On the other hand, Mundé, of New York, said that an experience of over twenty years had not led him to believe that it was justifiable to remove a uterine fibroid unless it produced symptoms by its pressure and rapid growth or caused profuse hæmorrhage or the patient insisted on an operation. If these patients were kept under observation, as they should be, they would not be allowed to reach an "inoperable" stage. Kelly, of

Baltimore, fully concurred in this view, and would only do total hysterectomy for tumors producing profuse hæmorrhage or which caused severe suffering by their pressure.

[The discussion, in which a large number of members (Palmer Dudley, Skene, Engelmann, Montgomery, Gordon, etc.) took part, culminated in a statement, made by Emmet, which in itself represented the happy medium between dissenting opinions expressed,—namely, that for years he had been misrepresented as opposed to the removal of the uterus. There were certain cases in which one could say at once that the uterus should be removed. His main point was that no one should remove the uterus until the canal had been dilated and a digital exploration had enabled him to form an intelligent opinion of the true position and condition of the fibroid tumor. If the canal were kept dilated and the patient under observation for some time, it would sometimes not be necessary to resort to a radical procedure. Interesting in this connection are the remarks of L. N. Varneck,⁵³⁰ who states that, as conservative surgeons, we should, whenever possible, revert to enucleation of the tumor, leaving the uterus and ovaries, and with them the procreative capacity of the woman. Castration, the removal of healthy organs, etc., are contrary to the principle of modern surgery, and can only be practiced while our methods of operating are still imperfect. See "Hysterectomy," F-40.]

Ernest Cushing, of Boston,²³ in discussing the various methods of operation for uterine fibroids, gives preference to extra-peritoneal treatment of the stump in favorable cases,—that is, where the abdominal walls are not too thick and the tumor can be lifted out so that a constrictor can be applied around the entire pedicle. The advantages of this method consist in its rapidity, the short time during which the abdomen is open, the entire protection of the intestines from exposure and handling, and the absence of shock. With proper care there need be no sloughing of the stump and little or no suppuration of the wound. In making use of the intra-extra-peritoneal method he intends in future to leave as little of the cervix as possible; to avoid the great danger of its sloughing, it must be amputated well below the level of the internal os after separation of the bladder from the cervix and ligation of the uterine arteries. This method is applicable to cases in which it is difficult to employ the former one.

Homans⁹⁹ reports twenty-six operations for uterine fibroids, in private practice, with one death. He ligates the broad ligaments and dissects off an anterior and posterior peritoneal flap in the usual way, and performs supra-vaginal amputation of the

uterus. After cauterizing the cervical canal he closes it by suturing the raw edges of the stump, being careful not to enter the canal, then unites the peritoneal flaps over it with fine silk, being afraid to use catgut for this purpose.

Delagénière, of le Mans, ¹⁰⁴⁸_{Mar., Aug., '96} highly recommends myomectomy, which consists in amputating or enucleating the neoplasm and leaving as little of the tissue of the stump as possible, the myomatous portion of the organ being removed. The coronal wound thus left behind is sewn up so that its edges are turned downward into the vagina, and the abdominal cavity is drained. The advantages claimed for this operation are: that the difficulty in securing the broad ligaments and in getting at the uterine arteries is not great; the ureters and adjacent structures cannot be damaged. At the same time the uterus is removed as far as the vagina without any manipulations from the vulva. When the fibroid has invaded the broad ligament it must first be enucleated, the broad ligament then cut away, and the cervix treated as in a simple case. Delagénière has lost but one out of twenty cases.

E. C. Dudley ¹⁰⁵_{Oct. 15, '94} prefers myomectomy to hysterectomy, the operation being supplemented by the removal of the appendages in the following three classes of cases: 1. Cases in which the appendages are the seat of such disease as would demand their removal under other conditions. 2. Cases in which the enucleation of the tumor or tumors has so injured the uterus as to render it incapable of performing its functions, especially if the injury be such as would cause cicatricial atresia at the uterine ends of the Fallopian tubes. This might be the occasion for the removal of the appendages on one side only. With increased experience this class ought to diminish. 3. Cases in which the uterus contains an additional myoma so inaccessible as to make enucleation extra hazardous.

Schauta, ⁸⁴_{Jan. 5, '96} to avoid the dangers incidental to myomectomy, the principal of which are deficient resisting power and liability to peritoneal infection, usually completes his operation rapidly—in thirty to thirty-five minutes—and leaves the amputation of the uterus to the last, after sewing the peritoneum to the pedic ball round below the elastic ligature, and then uniting fascia and skin separately. He has had sixty-five cases, with four deaths, two of which only arose from the operation.

Carle ⁵⁸⁹_{May 28, '96} ²_{July 6} has operated 160 times for uterine fibroids. In 13 cases he performed vaginal hysterectomy; in 11 enucleation and morcellement, with good results in each case; he would, however, reserve this method for submucous fibroids of moderate size. As a general rule, he prefers operating through the abdo-

men, and with this method his mortality sank to 1 in 54, whilst with other methods it rose to 7 per cent. Placing the patient in Trendelenburg's position, he makes a fairly large abdominal incision, divides the utero-ovarian vessels between forceps, makes a circular incision at the fundus of the tumor, comprising the serous and superficial muscular layer, works his way with finger or point of forceps to the serous involucrum, and ligatures the uterine arteries at their point of ingress with the uterus. The tumor can then easily be drawn up into the wound and dissected away. A ligature is placed just below the os uteri, so as to exclude any vaginal secretion, and an incision made above. The edges of the wound are disinfected with the thermo-cautery and united so as to leave a transverse line of suture at the bottom of the pelvis. The author has operated on 54 cases by this method with 1 death; some of the tumors weighed as much as 12, 15, and 16 kilogrammes; and presented other operative difficulties.

Von Erlach, ⁸_{July 18, '96} out of 69 hysterectomies for myoma, lost only 2 cases, 1 dying of embolism and 1 of acute yellow atrophy of the liver. He greatly prefers the vaginal operation whenever it is practicable. In the case of small tumors of the uterus not exceeding in size the head of the fœtus at the end of pregnancy, Péan, of Paris, ¹⁰⁰_{Aug. 8, '96} always performs the operation through the vagina, with or without preservation of the uterus, according to circumstances; but where larger fibrous or fibrocystic interstitial tumors of the body require removal he employs the combined method devised by him,—separation of the tumor above the cervix from the abdomen; removal of the remaining stump piecemeal through the vagina.

Two cases are reported by Davenport Parry, ³⁶_{Feb., '96} in which, after laparotomy, there was a great diminution in the size of the uterine myoma for which the abdomen had been opened. In the first instance the operation was quite imperfect, and the incision had to be closed without anything having been done either to the tumor or to the uterine appendages; in the second case the adnexa on the right side were removed, but those on the left could not be extirpated. In a third case the appendages on both sides were removed, and the fibroid disappeared entirely in two years. Of course, the last-named instance was not so extraordinary as the former two. Jouin, ¹⁶⁸_{Nov. 8, '96} in several cases of myoma of the uterus, tried dry extract of sheep's thyroid gland. He gave 4 to 8 tablets daily, equivalent to half a thyroid gland. Out of five cases the two which have been fairly long under treatment have distinctly improved in health. In the first case the tumor has distinctly diminished in size. Menorrhagia is much diminished by this

treatment. As in other classes of patients, hæmorrhoids present in at least one case were greatly relieved.

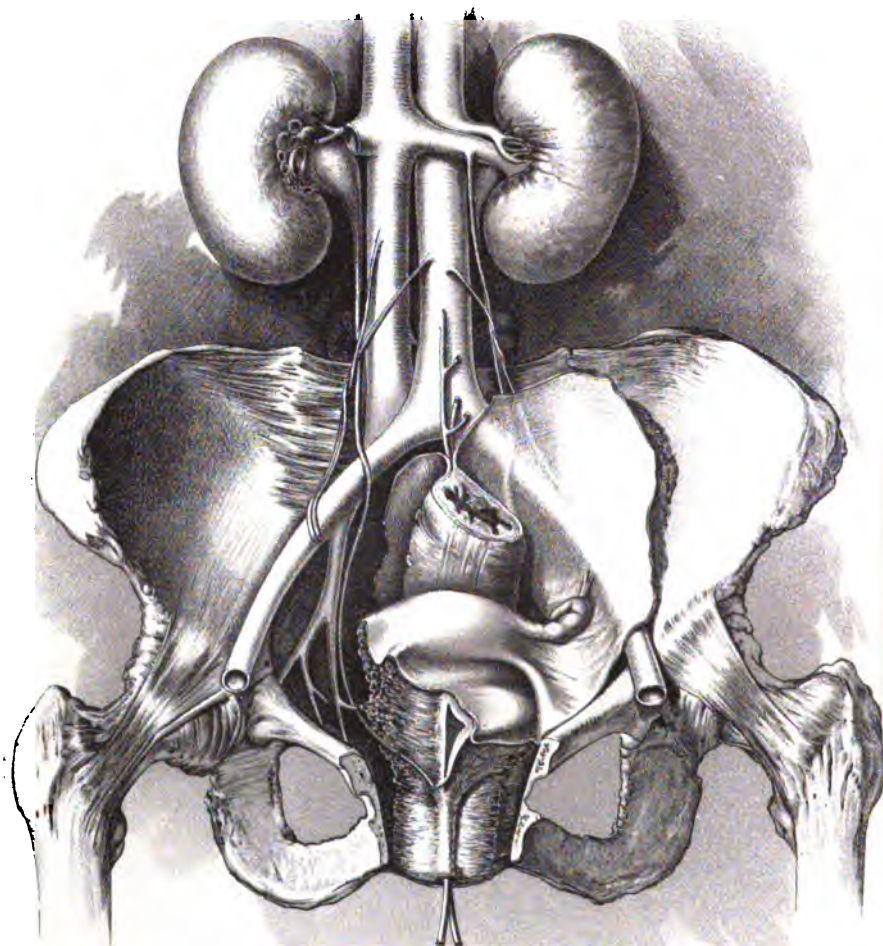
Cancer of the Uterus.

Pathology.—Von Müller,⁹⁵_{B.48,H.2} in a study of the contents of the carcinoma-cells in twenty-one cases of uterine cancer, observed in one case of carcinoma of the posterior lip three large, cyst-like bodies, with a clear, glistening membrane that would not stain, small cysts, and other intra-cellular, but not encysted, bodies. In his opinion, these are parasitic amœboid organisms. The cysts, he thinks, represent permanent forms of the intra-cellular amœbæ.

Seelig, of Strassburg,³¹⁷_{No.6, '96},⁵_{Jan., '96} after studying twelve uteri removed by operation, finds that cancer of the cervix extends through the chain of lymphatics accompanying the blood-vessels to the intra-muscular lymph-spaces connecting the cervix and corpus uteri; hence the disease does not long remain limited to the former. It extends upward through the external muscular layer rather than along the mucosa. This extension may take place in the earliest stage of the disease, when it is apparently confined to one lip of the cervix; hence a strict division into early and advanced stages is not really possible from an anatomical stand-point. Cancer of the corpus uteri is of relatively slow growth, extending centrifugally. The lymphatics between the middle and outer muscular layers are first affected; later the cervix. The uterine wall is involved from within outward, the outer layer long remaining intact, as well as the cervical mucosa.

Rosthorn,³¹⁷_{No.15, '96} and N. Flaischlen,³⁹³_{B.32,H.1, '96} report interesting cases of horny epithelioma of the uterus. The latter author, after a study of the literature of the subject, classifies this variety of uterine cancer into three categories: (1) the superficial extension of a cervical cancroïd over the inner surfaces of the uterine body; (2) the metastases of squamous epithelioma from a primary cervical carcinoma; (3) the development of a primary squamous epithelioma on the endometrium of the uterine body. He further concludes that the disease is secondary in the cervix from the following facts: (1) that there may be diffuse and associated infiltration of the carcinoma in the corpus uteri; (2) because of the deep-seated infiltration of the uterine muscle with carcinomatous nodules; (3) the likelihood of a secondary cervical carcinoma from a primary carcinoma of the corpus uteri; (4) the relative greater frequency of primary squamous epithelioma of the corpus uteri as compared with primary disease of the same sort in the cervical canal.

Condamin,¹⁰⁰_{Jan.19, '96} calls attention to a special form of uterine



Hysterectomy for Cancer of the Uterus (J.G. Clark).
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cancer, of a diffuse type, with polynuclear cells of non-striated muscle of an embryonic character. (See "Cancer," in section L, vol. iii.)

J. G. Clark, of Baltimore,⁷⁶⁴ July, Aug., '96 suggests a method of extirpating a considerable proportion of the broad ligaments with the cancerous uterus. The procedure is illustrated by the annexed colored plate and wood-cuts. His technique is as follows: Bougies are inserted into the ureters under cocaine anæsthesia. The patient is then etherized, a free abdominal incision is made, and the upper portions of the broad ligaments, with the ovarian ligaments, are tied. The bladder is then separated and the uterine arteries

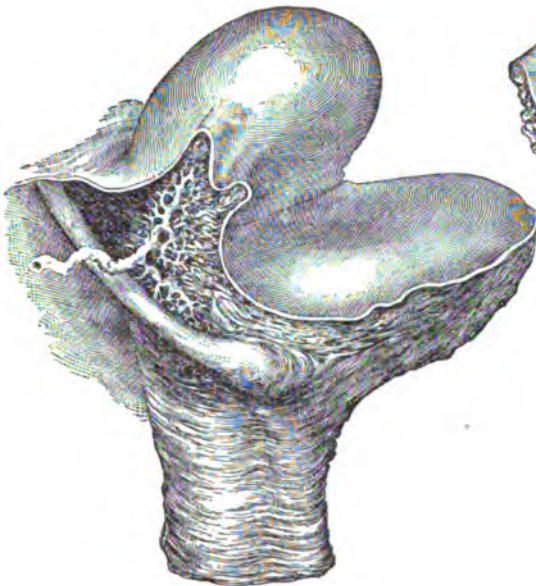


FIG. 1.

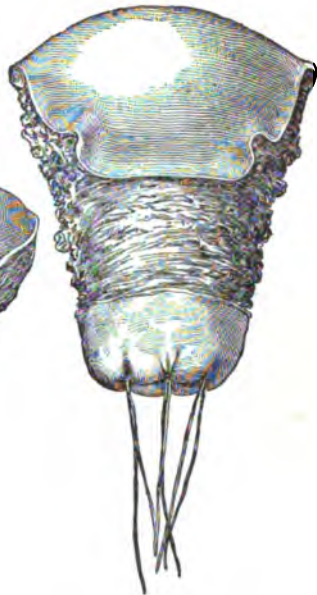


FIG. 2.

HYSTERECTOMY FOR CANCER OF THE UTERUS. (J. G. CLARK.)

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exposed and dissected out an inch beyond the vaginal branches, where they are ligated. The ureters are dissected free, when the remainder of the broad ligament is tied close to the iliac vessels and divided at its pelvic attachment, the dissection being carried well below the cancerous area. The vagina is then perforated with scissors and is tied in segments and divided. A strip of gauze is passed down into the vagina and the peritoneal flaps are sutured over the raw surface. Finally, the pelvic cavity is irrigated and the abdomen closed without drainage.

Explanation of Colored Plate.—In this plate the peritoneum of one side of the pelvis is dissected off, showing the intimate anatomical relations of the bladder,

uterus, uterine artery, and ureter. Bougies are inserted into the ureters, making them stand out as rigid tubes. The close relations of uterine artery and ureter and the ureter and cervical portion of uterus are well demonstrated, showing the impossibility of a wide excision of the broad ligaments without the introduction of the bougies into the ureters.

In Fig. 1 the peritoneum is dissected off, giving a lateral view of the uterus and bladder with their relations to the uterine artery and ureter and the latter vessels to each other. The impossibility of removing any of the broad ligament without great danger of cutting or ligating the ureters is perfectly demonstrated in this engraving.

Fig. 2 shows the uterus removed by vaginal hysterectomy, none of the broad ligaments or vagina excised with it.

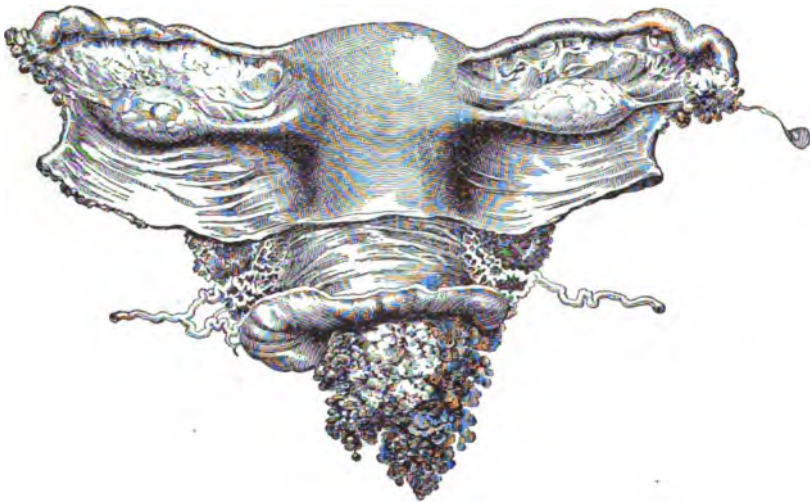


FIG. 3.—HYSTERECTOMY FOR CANCER OF THE UTERUS. (J. G. CLARK.)

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Fig. 3 shows the uterus as removed from Case II, the uterine artery being dissected out before the broad ligaments were freed from their pelvic attachments. The major portion of the broad ligaments and a considerable cuff of vagina were excised with the uterus *en masse*.

Fig. 4 shows the operation as it appears when completed. The space left by the removal of the uterus is filled with gauze from above, after which the vesical and rectal peritoneum are whipped over it with a continuous suture of fine silk, beginning at one ovarian stump and running across to the opposite stump.

John Byrne, of Brooklyn,²⁷ Oct. 27, '96 recommends galvano-cautery in performing vaginal hysterectomy. After a large clinical experience he reached the conclusion that, when fixation has already

been reached and the lymphatics and cells in the broad ligaments have doubtless arrived at a primary stage of degeneration, there is but one operation of any lasting value, and that is supra-vaginal excision by the cautery-knife (not loop) and thorough additional cauterization of the bottom, sides, and edges of the excavation. As to the mode of procedure, there is really no material difference from that usually adopted where other means are employed.



FIG. 4.—HYSTERECTOMY FOR CANCER OF THE UTERUS. (J. G. CLARK.)

Johns Hopkins Hospital Bulletin.

Thermo-cautery is also recommended by A. Rosner, of Krakow,³¹⁷ and Mackenrodt, of Berlin.³¹⁷ The latter surgeon employed the Paquelin cautery in an inoperable case and was able to remove more diseased tissue in the broad ligaments than if the clamps or ligatures had been used.

Veit³¹⁷ does not think that sufficient attention has been paid to the different varieties of cancer as regards recurrence after

hysterectomy, and is not inclined to agree with Winter in his statement that a considerable proportion of such recurrences are due to the infection of healthy raw surfaces during the operations. He divides cases of carcinoma of the cervix clinically into those in which the disease is situated in the portio or in the cervical canal, and in which it appears in a nodular form in the cervix, or as disease of the corporeal endometrium. Primary nodules in the cervix originate in the connective tissue and are now regarded as endothelioma. As regards extension of the disease, the writer has often found cancer-cells in the lymphatics of the broad ligaments; when these infected vessels are divided during operation it is natural to infer that they form foci from which a rapid recurrence takes place. The latter form of recurrence is characterized by the fact that the metastatic deposits present the same histological structure as the primary disease, and that they rapidly invade the deeper tissues. The simultaneous appearance of two apparently independent primary cancerous nodules can usually be explained by referring the more deeply seated one to secondary infection.

Treatment.—T. Bowreman Jessett, of London, ²_{Jan. 19, '96} states that those cases only are fit for operation in which the disease is recognized early, is limited to the uterus, and in which the cellular tissue around the cervix and the broad ligaments are free from infiltration, the uterus being freely movable. According to Paschen, of Bonn, ³¹⁷_{Oct. 5, '96} among the conditions in which total extirpation for cervical cancer is always indicated is that in which there is a malignant growth in the cervix and another in the fundus uteri, but with a distinct tract of healthy tissue between the two centres.

[As this is difficult to determine, it is better in all cases to extirpate the uterus, even if a small portion only of the cervix be involved.—E. E. M.]

C. E. Jacobs, of Brussels, ¹_{June 16, '96} stated to the American Gynecological Society that he had done 403 vaginal hysterectomies, with 391 "operative cures" and 12 deaths, or a mortality of 2.9 per cent. He advocated extirpation for uterine cancer when the uterus was free and there was no evidence of the disease having extended beyond.

Mangiagalli, ⁹⁴³_{Nov., '94} after showing that the mortality of hysterectomy has gradually lessened from 25 per cent. (Bruner) to 3.3 per cent. (Kaltenbach), expressed his preference for hysterectomy. He does not limit his cases to those in which there is complete mobility of the cancerous uterus, and leaves the uterine adnexa unless disease justifies their removal. From a study of his statistics, Mangiagalli concludes that the most important prognostic

element in cancer of the neck is the spreading of the process to the vagina or parametrium.

Richelot, of Paris, ³_{Nov. 4, '95} reports 44 vaginal hysterectomies for cancer with 3 deaths. Mackenrodt, of Berlin, ³¹⁷_{No. 6, '95}, ⁵_{June} believes that hysterectomy as a curative procedure in carcinoma of the uterus has a limited field of usefulness, and that it is only by a close study of the indications that the results can be improved. Since the object of palliative treatment is to preserve the patient's life and to relieve her sufferings as long as possible, all dangerous means to attain this end are unjustifiable. The object of the radical operation is to cure. Cœliotomy offers a better prospect of removing all the disease than the vaginal operation, because the surgeon is able to observe the condition of the broad ligaments and to place his sutures beyond the diseased portions. Even in cases of incipient carcinoma of the portio, combined vagino-abdominal extirpation is the more certain procedure, while the mortality in the writer's hands has been but little greater than in the vaginal. Another important argument in favor of the abdominal method is the possibility of avoiding the danger of infecting healthy tissues by the use of the cautery. The writer sees no advantage in the use of clamps, but thinks that in complicated cases they increase the danger of the operation. Morcellation of the cancerous uterus is objectionable, because of the risk of infection. (See "Hysterectomy.")

In a paper on the intra-parenchymatous injection of alcohol in the treatment of cancer of the uterus, Vulliet, of Geneva, ²⁴_{Dec. 22, '94}, ¹⁵_{Mar., '95} divides cases suitable for this method of treatment into two groups: (1) cases where hysterectomy is impracticable owing to the advanced stage of the disease; (2) cases where, hysterectomy having been done, infiltration of the neighboring tissues is suspected, or, still more, where a recurrence follows the radical operation. He quotes four cases which were fairly treated by this method, and in all amelioration of the symptoms took place, those doing best which were treated most regularly. Before inserting the needle the cancerous surface must be well cleansed, so that the deeper parts may not be infected from the surface. The vagina, cervix, and new growth are all washed with a solution of soda followed by a solution of sublimate 1 in 1000, all free fluid being then mopped up by tampons. No anæsthetic is usually necessary, and the genu-pectoral position is recommended as being most convenient for operating. Three or four aseptic Pravaz syringes are placed handy and filled with absolute alcohol of the best quality. The injections are then made, the first in the centre of the growth and the following ones toward the periphery. In the scirrhus

variety the needle at once penetrates tissue which can be injected; in the encephaloid variety a considerable bed of friable tissue must often be passed through before firm tissue is reached. If the entrance of the needle cause hæmorrhage, this must be arrested before the alcohol is injected, otherwise the blood will interfere with the action of the alcohol. After injection, each needle is left in place until all the injections are completed; this prevents the alcohol running back in the track of the needle, as it would do if the needle were immediately withdrawn.

[The department of "Tumors," section L, vol. iii, contains further information upon the use of alcohol in the treatment of cancer.]

F. X. Bernhart ³¹⁷_{No. 30, '74} in six cases of inoperable uterine cancer obtained satisfactory results by means of intra-parenchymatous injections of a 6-per-cent. solution of salicylic acid in alcohol, at 60 degrees. At each sitting he injected seven or eight times into the tissue of the neoplasm itself a few drops of the solution, in no case exceeding 2 cubic centimetres (31 minims). Fawiuss ³_{No. 8, '76} employed the same method with equally good results.

Lucas ⁹⁹⁶_{Dec., '74}, ⁸⁰_{June 15, '75} recommends as a dressing for uterine cancers the following powder, to be applied after the raw surface has been freely exposed:—

R Benzoin,
Iodoform,
Magnesia carbonate, . . . of each 2 drachms (8 grammes).

This dressing arrests and diminishes the fetid secretions and prevents them from producing excoriations upon the vulva and perineum.

[Dusting with pyoktanin associated with gauze packing decreases the discharge and improves the general condition.—E. E. M.]

Malignant Deciduoma.

George William Beach, of Binghampton, N. Y., ⁹⁶_{May, '76} considers malignant deciduoma as a distinct variety of malignant tumor, having histological elements and a clinical evolution that are absolutely characteristic. It has well-established etiological relations with pregnancy, and often with hydatiform moles. The rapidity of its evolution makes an early diagnosis very important.

Fraenkel ⁸⁵_{V. 49, No. 2, '76} states that clinical evidence has shown that malignant deciduoma is often associated with hydatiform mole, and that small portions of a mole of this class usually remain behind after the greater part has been expelled. The superficial epithelial layer (syncytium) of the chorionic villi proliferates

considerably when a vesicular mole develops, and it is precisely from this abnormal development of epithelium that the cancerous change known as malignant deciduoma is evolved. The deeper cellular investment of the chorionic villus (Langhan's layer), according to Fraenkel, takes no primary part in the development either of the mole or of the cancer.

Kossmann, of Berlin, ¹¹⁹⁰_{2,2,11,2} states that for both strata—the one foetal and the other maternal—as thought by Marchand to be implicated in the development of these malignant growths is from general pathology impossible, especially because of the metastases. He prefers to suppose that cell-boundaries re-appear in the syncytium, and that the new growths arise from this alone. He declares that it is most improbable that carcinoma should have existed before conception, and that it is far more likely, and in regard to general pathology quite possible, for a “syncytial carcinoma” to develop during pregnancy.

Hartmann and Toupet ⁷_{Oct., '94}; ²_{Jan., '95} describe an instructive case of this remarkable disease only recently discovered by pathologists. The patient was 25; married at 23; she bore a child eighteen months before admission into hospital. Menstruation occurred during the last six months of lactation. Then the period ceased for three months after a very free hæmorrhage. There was slight oozing, almost continuous, till at the end of six months after the beginning of the free hæmorrhage another attack set in, with rigors, and lasted a fortnight. The uterus was dilated for three days, and at the end placental relics were removed; the temperature was then over 104° F. (40° C.). The patient went on bleeding for a month, when the uterus was found enlarged. Hysterectomy was proposed, but before it could be done the patient had another severe attack of bleeding, followed by the expulsion of a mass resembling placental tissue. The patient died. Two tuberos, hemispherical masses were seen projecting from the surface of the uterus. On section through the uterine wall they were found to be continuous with two pieces of placental relics. The microscope proved that the masses in the wall were placental tissue derived from the relics and undergoing malignant degeneration.

In a case reported by Schauta, of Vienna, ⁸¹⁷_{Dec. 9, '96}; ¹¹²_{Jan., '96} microscopical examination of the scrapings proved the growth to be deciduosarcoma, and vaginal hysterectomy was performed with little difficulty and ultimate success. The ovaries were found to be considerably enlarged and were also removed. The vaginal deposit was excised. Not only the endometrium, but also the vaginal deposit and the connective tissue of the ovaries contained new

growths, resembling decidual tissue. This appears to be the first case in which the ovaries were infected. The author states that three distinct forms of malignant degeneration of the decidua have recently been distinguished. In the first form proliferation of the connective tissue of a decidual relic occurs (Gottschalk's sarcoma of the chorionic villi). The second has a proliferation of the epithelium of the villi (Klein's carcinoma of the villi). The third and commonest variety has the decidual cells, and not the epithelium of the villi, proliferating; hence, the new growth must be regarded as a sarcoma (*sarcoma deciduo-cellulare*, according to Schauta). Menge³⁹³_{v. 30, p. 2, 74} contributed an exhaustive monograph on this subject.

Malignant Adenoma.

William S. Stone, of New York,¹_{July 27, '96} states that there occurs in the uterine mucous membrane a moderate glandular hypertrophy and hyperplasia associated with chronic inflammation, which is entirely distinct from any tumors in the same region. The glands are simply more tortuous and more numerous and the lumen is larger, but their general structure is the same as that of normal utricular glands. More marked examples of glandular hyperplasia occur, which often simulate clinically malignant neoplasms. They often occur near the menopause, may cause severe hæmorrhages, and impair the general health. Sometimes they have to be curetted several times before the condition disappears.

Anatomically these cases are characterized by an excessive number of glands, but the epithelium does not show any marked tendency toward proliferation, and there is still a large amount of stroma left in which inflammatory changes are going on. There is an increased number of stroma-cells and an infiltration with leucocytes; there are new blood-vessels, and oftentimes interstitial hæmorrhages occur. The whole picture is one of inflammation, in which the glands are increasing in number simply as part of the general inflammation.

Some of these more marked cases probably do become malignant, and therefore a careful microscopical examination of all curettings should be made. Although a positive diagnosis between adenomatous hyperplasia and adenoma may not always be made from the curettings, yet it is possible, in the large majority of cases, to form a conclusion of sufficient accuracy.

Adenomata occurring in the uterine mucosa are tumors consisting almost entirely of glands which conform in general to the normal gland type. There is very little interglandular tissue, and, while there may be an inflammation going on, it is entirely sub-

sidary to the main process,—i.e., growth of new glands. The epithelium lining the alveoli shows a tendency to proliferate, but a lumen or the suggestion of a lumen exists.

Adenomata in the uterus are always malignant, because they invade neighboring tissues and recur unless completely removed. Although they may represent a transitional step between simple glandular hyperplasia and carcinoma, they certainly often develop to a high degree without losing the anatomical characteristics of adenoma.

Adenoma usually, perhaps always, begins in the body of the uterus, and does not involve the cervical mucous membrane; and, while it invades the muscular layers and eventually goes beyond the uterus, it remains confined to the mucous membrane longer than carcinoma does. It might be described as spreading around in the mucous membrane rather than burrowing through the different layers, and thus quickly involving other parts. Compared with carcinoma of the uterus clinically, adenoma of the uterus usually occurs later in life than carcinoma and lasts longer without causing cachexia. Frequently there is a history of irregular hæmorrhages for several years, during which time the patient has been curetted several times without permanent relief. Pain and discharge are not such prominent symptoms in adenoma as in carcinoma. The enlargement of the uterus is more marked in adenoma.

The treatment for adenoma of the uterus should be the same as for carcinoma. The prognosis after removal is better than in carcinoma, because, from its manner of growth, complete extirpation of the growth is more certain.

Tuberculosis of the Uterus.

Thomas S. Cullen, of Baltimore, ⁸⁵⁸_{v. 4, No. 7, 8}, states that, although tuberculosis of the endometrium is found rather frequently in autopsies, it has, until recently, been rarely noted clinically. In eighteen months, in conjunction with Kelly, he had occasion to observe three such cases, two of which were submitted to post-mortem examination. He considers that endometrial tuberculosis may be divided into (1) miliary and (2) chronic diffuse. The latter usually commences at the fundus and in its earlier stages cannot be recognized by its naked-eye appearances. Yellowish-white nodules appear in the course of the disease, giving the surface an uneven appearance, and finally ulcerate. The uterine muscle becomes affected by a process of extension. The endometrial condition is usually secondary to disease of the Fallopian tubes; the ovaries are, as a rule, normal, but may be affected. There

appear to be no definite symptoms, those present being due rather to the tubal than to the endometrial disease. A diagnosis can be made from scrapings removed by the curette, except in the very early stages, when the cornua only are involved, and hence out of reach of the operator. Cullen recommends removal of the uterus as well as the tubes in these cases.

According to A. Sippel, ⁸⁹_{No. 22, '94}, ⁵_{May, '96} primary genital tuberculosis results from direct external infection through the vagina, the tubes being more susceptible than the uterus so long as menstruation persists. The diagnosis is made not only by direct palpation of the diseased tubes, but by the detection of tubercle bacilli in bits of the endometrium removed by curettage, and is confirmed by the subsequent development of tuberculous peritonitis. Since it is important to preserve the function of menstruation, the whole or a portion of the ovaries should be spared when the diseased tubes are extirpated. Direct infection of the peritoneum may take place from the latter.

J. L. Reverdin and F. Buscarlet, ¹⁹⁷_{Aug. 20, '96} report a case of secondary tuberculosis of the uterus involving the external os. The latter presented a soft, circular ulcer, the base of which was pinkish and covered with delicate-yellow spots. The uterine cavity and the surface of the ulcer were scraped and a red pulp mixed with little yellow masses was brought away. The bacteriological examination (by Massol) of this tissue, both from the cavity and the ulcer, showed numerous tubercle bacilli. Secondary tuberculous ulceration of the uterine cavity rarely spreads to the cervix. There was a history of diarrhoeal hæmorrhage, followed by leucorrhœa.

Hysterectomy.

The advisability of removing the uterus varying according to the disease that may be present, the indications for the operation will be found under "Fibroma of the Uterus" and "Cancer of the Uterus," F-23 and F-30.

Vaginal Hysterectomy—Incision.—In the performance of vaginal hysterectomy, Schuchardt, of Stettin, ¹¹⁹⁰_{B. 1, B. 2}, ⁹⁶_{Feb., '96} states that by the aid of two accessory incisions the field of operation can be so much widened that not only the uterus can be easily handled, but every vessel can be separately treated and the broad ligament can be easily examined throughout. Both ureters can be isolated for a long distance, and, when necessary, a portion of the diseased bladder can be removed. These accessory incisions are: 1. The lateral division of the entire vaginal wall from below as far up as the cervix. 2. An incision which is a continuation of the lateral incisions, and which is carried posteriorly to a point level with the

apex of the coccyx, encircling the rectum like a bow. During the operation the patient lies upon the back with the legs well elevated. The skin incision and the lateral vaginal incision are made on the side upon which the broad ligament is diseased.

Clamp or Suture.—T. Bowreman Jessett, of London, ²_{Jan. 19, '96} in an able paper read before the British Medical Association on vaginal hysterectomy, states that the main advantage of the clamp appears to be more rapid removal of the organ; but, as in any ordinary case of vaginal hysterectomy the uterus can be removed and the broad ligaments tied comfortably in from one-half to three-fourths of an hour, he does not think this argument in favor of the clamp. Again, the ends of the clamps must project into the peritoneal cavity and so keep up a communication between this and the vagina. It may be argued that this affords good drainage and that these clamps may be removed on the second day; but the tissues which have been compressed by these clamps must necrose, become detached, and expose the patient to sepsis.

Moreover, he states that statistics have shown that intestinal obstruction is much more frequent after the use of the clamp than after the use of ligature. Again, one or both ureters have been caught in the clamp over and over again, and many surgeons who formerly used the clamp have now abandoned it, as they found not infrequently that on removal of the instrument hæmorrhage occurred. Lastly, but by no means, to his mind, the least objection to their use is the weight and general discomfort caused to the patient by the retention of the clamps in the vagina for two or three days.

He considers the evidence is strongly in favor of the use of the ligature, and here a question may arise: Should the ligature be of silk or catgut? There is no doubt there are many strong arguments in favor of the latter, as the ligatures may be cut short at once, and the surgeon need not trouble his head further about them; whereas silk must be left long, and in some cases they do not come away for some considerable time. Personally, he always uses silk for the uterine arteries; for the ovarian and rest of the broad ligaments he often uses catgut.

In a paper read before the American Association of Obstetricians and Gynecologists at Toronto, E. W. Cushing, of Boston, ²³_{May, '96} also expressed his preference for the ligature in these operations. Edebohls, ⁵_{Jan. '96} states that he will never again leave a clamp in the body except in the dire necessity of being unable to secure a bleeding-point by ligature or torsion. Enucleation of the uterus, with ligature of the bleeding vessels only, is, in his opinion,

the ideal method. All of his nine vaginal hysterectomies have recovered well from the operation.

J. M. Baldy, of Philadelphia, ²⁷_{June, '96} uses catgut sutures, finding that convalescence is rendered less tedious and uncertain. He still retains silk for ligating the uterine and ovarian arteries, not being yet satisfied to trust to the strength of catgut, the more so as the latter is apt to be weakened by overpreparation in rendering it sterile. E. C. Dudley, of Chicago, uses catgut entirely in the abdominal cavity, and has had no occasion to regret its use. A. MacLaren, of St. Paul, ⁹_{June 15, '96} also advocates the use of catgut in gynæcological operations, prepared by steam and dry sterilizing, a sufficiently high temperature being used for the necessary time to destroy germs without rendering the catgut brittle. S. C. Gordon, of Portland, Me., ¹_{June 15, '96} has used, for the past twelve years in hysterectomy operations a continuous suture of catgut. He argues that there was less danger, owing to its elasticity, of strangulating the tissues. If the tissues are fragile from inflammatory action, catgut sutures can be used to almost any extent in the event of annoying bleeding. Moreover, the absorption of the catgut always takes place; so that there is much less danger of fistulæ. In his experience, no casualties have followed its use that might not have occurred with any other kind of suture.

On the other hand, Noble ²⁷_{June, '96} uses only the silk ligature, and states that he has never had any trouble. A large silk cord is apt to give more trouble than a small thread, partly because the ligature is tied more tightly, reducing the vitality of the stump, and partly because if a large ligature is infected the white blood-cells are less able to combat the resultant septic processes about the ligature. He has been using silk-worm gut as a buried suture for abdominal wounds for three years, and out of several thousand such stitches he has had trouble in but three cases, in which supuration took place in dead spaces. Polk ¹_{June 22, '96} carefully prepares his cases, and has found that those in which he used silk did better than those in which catgut had been employed.

Flushing and Drainage.—Jessett ²_{June 19, '96} is of the opinion that the peritoneum should be flushed out before packing, as often clots of blood collect in the peritoneum. Any septic discharge is thus washed away.

[The general subject is extensively treated in the article on "Dressings and Hæmostatics," vol. v, section C, and under "Cœliotomy" in this article. A view at present much entertained is that flushing causes dissemination of infectious process by carrying germs in unaffected regions.]

E. Kurz, of Florence, ³¹_{Nov. 24, '94} also recommends dry asepsis in

vaginal hysterectomy, with complete closure of the peritoneal cavity afterward. He cleanses the vagina beforehand with soap and water, and uses no irrigation subsequently, dry gauze being employed for sponging. No pad is introduced into the peritoneal cavity when it is opened, as the patient's hips are elevated so as to prevent prolapse of intestine. All ligatures (silk) are cut short, and the peritoneal and vaginal wounds are closed, the edges of the two having been previously united in the usual manner during the operation.

If there has been much difficulty in withdrawing the uterus or there has been much oozing, Jessett,²_{Jan. 19, '96} considers it safer to introduce a glass drainage-tube. He has seen trouble from want of attention to this point. Some surgeons are contented with introducing a piece of gauze. The great risk in drainage is when it is withdrawn; after forty-eight hours he has seen the omentum adherent to the tube or gauze and drawn out between the flaps.

Peritoneal Flaps.—Should the peritoneal flaps be stitched together or not? Jessett,²_{Jan. 19, '96} has never been in the habit of stitching the peritoneal flaps together, although, in some instances, if they are long, he has passed one suture through and drawn the flaps well down by packing the vagina. He considers this stitching of the flaps altogether unnecessary and harmful, as, in those cases in which the peritoneum must have come into contact with the diseased part of the uterus, some septic matter must have contaminated the peritoneum, and, by closing the exit, the risk of septic peritonitis is much increased. It is, however, very important, he states, to draw these flaps well down into the vagina so as to allow of a free discharge from the peritoneum, this by catching the two flaps with pressure-forceps and packing around them with iodoform gauze. This point has not received the special attention of other experienced operators. He considers stitching of the peritoneum to the mucous membrane of the vagina as absolutely unnecessary and a waste of time.

Hæmorrhage.—In order to avoid hæmorrhage in vaginal hysterectomy, R. Condamin, of Lyons,³_{July 10, '96} instead of making a complete circular perivesical incision, makes two semicircular incisions,—one anterior, the other posterior,—taking care not to include the mucous membrane of the lateral *culs-de-sac*. He then detaches the bladder according to the classical method, and, when the posterior *cul-de-sac* has been opened, he places at each side of the cervix an hæmostatic forceps, taking in the base of the broad ligament and the vaginal mucous membrane at the point of lateral insertion of the vagina into the cervix, thus compressing not only

the uterine artery, but the utero-cervical branches, transverse, recurrent, utero-vaginal, and even vesical. In six cases thus treated hæmostasis was complete.

Abdominal Hysterectomy—Stump.—Walthard, of Bern, ³¹⁷_{Jan. 4, '96}, after a series of experiments in rabbits, reaches the conclusion that, when the stump is transfixed, ligated, and dropped back into the cavity, the fact that its circulation is cut off by previous ligation of both uterine and ovarian arteries does not increase the danger of sepsis, provided that it has not been infected during the operation. This corresponds with the practical results obtained by Zweifel, Kocher, and Leopold, who adopted this method of treating the stump.

Faguet and Vitrac ⁹¹_{June, '96}, ⁶⁷³_{Sept.} publish nine interesting cases from the service of Lanelongue at the hospital St. André, Bordeaux, with eight recoveries. Supra-vaginal abdominal hysterectomy was done for fibromyoma, the pedicle being treated retroperitoneally. Lanelongue always removes the uterus with the appendages, leaving the neck adherent to the vagina. By this method the stump formed by the neck is protected in the abdominal cavity by suture of two sero-muscular flaps,—one taken from the anterior, the other from the posterior surface of the uterus. The mucous membrane of the cervical cavity is destroyed by the thermo-cautery. The authors express the opinion that retroperitoneal treatment of the pedicle for uterine fibromyoma is superior to all other methods, rendering abdominal hysterectomy as benign as any other abdominal operation.

Sutures.—Ralph Waldo, of New York, ²³_{p. 357, '96}, considers it very seldom necessary to bury sutures in the abdominal wall; when it is he prefers silk-worm gut. A double row of sutures is passed, one row being inserted in the skin from half an inch to an inch from the edge of the wound (depending on the thickness of the abdominal wall) and going through the entire thickness, including the edge of the peritoneum, and emerging in a corresponding manner on the other side, while the second row enters the skin not more than a quarter of an inch from the cut edge and passes down through the skin, fat, and fascia only, and comes out in a like manner on the opposite side, the two rows of sutures alternating. If suppuration occur with a buried suture there is more or less burrowing of pus. This seldom happens where the suture comes to the surface, as the stitch can easily be removed if there be trouble. In many cases it is impossible to properly approximate homogeneous tissues with only a deep suture, including the entire abdominal wall. The especial advantages claimed for this method of closing the abdominal wound are: (1) accurate ap-

proximation of homogeneous structures, especially the fascia; (2) no buried sutures to cause trouble if they suppurate; (3) if supuration occur it is easily treated and burrowing of pus prevented; (4) it thoroughly supports the wound as the combined effect of deep and superficial sutures is produced.

Tait, ²²July 3, '96; ⁵Oct. while he does not believe that any ligature is perfect, affirms that the Stafford knot can always be depended on if the following precautions are observed: (1) if the pedicle is long and round it should be tied as far from the uterus as possible; (2) in passing the ligature a cutting-needle must never be used, and veins should always be avoided; (3) the "slack" of the knot must be taken in by drawing upon the ends several times, then after securing the first hitch the pedicle is divided, the second hitch being secured at the end of the operation after retightening the first; (4) the division of the pedicle is a most important detail, to the neglect of which many cases of slipping are due. The writer emphasizes the fact that it makes little difference how much tissue is left on the distal side of the ligature; a short-cut pedicle, and especially one that is divided straight across, is always dangerous. If it is thin and broad it should be divided as in making the flaps in an amputation.

Drainage.—Boisleux ⁸¹⁷_{Dec. 16, '94} tried in sixty cases, among which were some purulent pelvic affections, the through-and-through drainage of Chopert, in which the tube, passing from the abdominal opening out through the vagina, admits of irrigation with antiseptics. He speaks highly of its merits, most of his patients having been able to leave the bed on or before the tenth day. The technique may be thus summarized: The tube is placed in iodoform ether; then a strip of gauze about one-fourth its calibre is drawn through it and held in place by silk-worm or catgut. A T-bandage soaked in a 2½-per-cent. solution of carbolic acid is placed over the vulva. The first day after the operation the strip of gauze is removed from the inside of the tube. On the second day the vaginal toilet and T-bandage are renewed. On the third day the vaginal toilet is again renewed and an intra-peritoneal injection of 0.5-per-cent. carbolic solution is given, followed by iodoform packing of the vagina. On the following eight days the vaginal packing is prepared by dipping the carbolized gauze in

R Olive-oil,	3 fluidounces	(93.00 cubic centimetres);
Creasote,	37 grains	(2.40 grammes);
Menthol,	75 grains	(5.00 grammes),

and packing the same back against the wound through the vagina.

In all these manipulations the vagina is previously anointed

with borated vaselin (5 per cent.) to lessen the irritation. The method of drainage should continue four or five days.

Complications and Sequelæ of Hysterectomy.—Kelly ⁷⁶⁴_{V. 4, No. 7, '96} reports the history of a case of ureteral fistula which developed as a sequel to vaginal hysterectomy. Richelot ⁵⁵_{Apr. 30, '96}; ²_{May 11, '96} observed the development of small vaginal fistulæ a week or ten days after hysterectomy. They coincide with the separation of the eschars and are generally considered to be due to wound of the ureter, but Richelot thinks it more probable that they are the result of damage to the base of the bladder. French surgeons have recently discussed the fact that in vaginal hysterectomy the right is more frequently wounded than the left ureter. Fournel ¹⁰⁰_{Apr. 22, '96} shows that this is due to the fact that the right forefinger with little difficulty can thoroughly separate the tissues on the left side of the cervix, while the uterus is drawn down by the left hand holding the volsella; but it cannot so easily separate the cervix from the structures on the opposite side. The left hand, when grasping the volsella firmly, so as to draw the uterus well down, tends to be supinated, and in that position it draws the uterus easily toward the right side of the patient; hence it is easy to separate the tissues to the left of the cervix working with the right forefinger, since the left hand does not readily get fatigued; but, to let the right forefinger work in the right side of the uterus, the left hand has to be pronated, depressed toward the patient's perineum, and swung to the patient's left. To hold the volsella long in so clumsy a position is very tiring, and, of course, the right hand shares in the fatigue; hence the right side of the cervix is not always well cleared from surrounding tissues. The right ureter is consequently in danger when the ligatures are applied. The best way of avoiding the accident is to make a trusty assistant grasp the volsella and draw down the uterus with his right hand, while the operator clears the cervix on the right side with his own right forefinger. Jessett ²_{Jan. 19, '96} says that injury to the ureters is rare if care is taken, in separating the bladder from the ureters, to go widely on both sides, so as to lift the ureters well out of the way, and when applying the ligature to introduce the needle from before backward; by adopting this procedure the needle passes under the ureter and between it and the artery.

A. J. C. Skene, of Brooklyn, ¹⁵⁷_{May, '96} performed vaginal hysterectomy for epithelioma of the uterus. The patient had complete suppression of the urine for one hundred and thirty-five hours, when the kidneys resumed their function and she recovered.

Henry L. Elsner, of Syracuse, ⁵⁹_{Feb. 9, '96} related the case of a patient who was operated upon by an expert gynæcologist in New York,

who removed the uterus with a fibroid and the ovaries. She suffered from a fistulous tract afterward and certain symptoms which it was difficult to explain, and it was proposed that laparotomy be again performed. This, however, was not done, and six months after the hysterectomy she discharged a large gauze pad per rectum. This had probably been overlooked by the nurse reporting all sponges and pads removed when she had counted one folded on itself as two.

In the discussion Boldt said that he had within a year removed a fibroid of the uterus; the woman did well for awhile, then complained of griping pains, and after two months brought him a gauze pad which she had passed per rectum.

Miscellaneous Methods.—Ernest W. Cushing, of Boston, ²³ June, '96 states that he has tried all the principal methods, beginning with that of Schroeder, but in none was his success as good as with that of Chrobak; so that, finally, he has returned to the latter procedure, which has given him twenty consecutive recoveries. At present, therefore, he prefers this method in all cases in which it is applicable,—that is, where the cervix is not voluminous and where there are not such extensive bleeding surfaces as to make free downward drainage desirable.

If the tumor is malignant or if for any reason it seem best to remove the whole cervix, he does so, and uses a drain of iodoform gauze in the vagina. If time is important or if there is oozing in the abdomen, he finishes the operation by Polk's method; but if the conditions are favorable he closes the peritoneum completely above the gauze. In any case he is apt to use a glass drainage-tube for one day, unless the case is particularly simple.

Martin, of Berlin, ⁴ No. 29, '96; ²⁸ Oct., '96 has done sixty operations on the pelvic organs by opening the abdomen through the anterior fornix of the vagina. The patient is placed on the back, with the thighs flexed, while a longitudinal incision is made down the vagina. The bladder is dissected up and the abdomen opened by a blunt instrument. The uterus is drawn forward into the incision, and the ovaries and tubes can be drawn out and removed if necessary. After the operation the wound is closed by two or more rows of catgut.

At the meeting of the American Medical Association, N. Senn, of Chicago, ⁶¹ Aug. 10, '96 described the technique of a new method, the aim of which is to secure access to the uterus in as short a time and with as little exposure of the organ as possible. After incision, as in the ordinary manner, with ligation of the ovarian arteries, the uterus is brought to the wound. The peritoneum is

then incised across the uterus, and the flap thus matched to the parietal peritoneum. The opposite side is treated in the same manner, thus forming material for a sort of cuff, readily made by means of dissecting-forceps and the hand. As soon as the cuff is sutured to the lower angle of the wound the remainder of the abdominal incision is closed. The tumor or tumors are then extirpated. This part of the operation can be accomplished within a few minutes and the remainder proceeded with leisurely. The uterus is next amputated at the desired point. If the cervix is affected the entire organ can be extirpated in the same manner. The uterine arteries are then ligated by an indirect ligature, but the arteries need not be isolated; they are merely recognized and tied. Amputation is effected by an oblique incision so made as to form a cone of the uterus and a corresponding depression in the parts left. There is very little hæmorrhage if the arteries are tied on both sides. After removal of the uterus the mucous membrane of the cervical canal is cauterized and the uterus closed by chromicized catgut. Two additional rows of buried sutures are then inserted to close the stump and thus arrest parenchymatous oozing. If hæmorrhage occur at any time, the amputated surface remains in ready access for the next forty-eight hours. Adhesions need not be dreaded, the enucleation being practiced whether the uterus be adherent or free. If antiseptic precautions are taken, the only possible source of infection can be the hand or sponges. The wound, two or three inches long, with the stump of the uterus on the floor, is packed with iodoform gauze, and temporary sutures are inserted. In from twenty-four to forty-eight hours later the gauze is removed and the wound closed. At no time is there any tension at the stump. If infection should occur after the operation, it is limited to the wound outside of the peritoneum. The crucial test of an operation is furnished by its results. In thirty-two unselected cases treated by this method recovery ensued in all without untoward results.

Richelot,⁴⁸_{May, '88} has devised a procedure which may be performed quickly and is attended with less danger than other operations. Ligatures and sutures are not required, forcipressure only being used. A scalpel, a dissecting-forceps, a long and a short hæmostatic forceps, and, finally, two long Richelot forceps provided with a long "bite" comprise the armamentarium necessary. The patient is placed on her back and the operator takes his station between the separated limbs. The vagina is first thoroughly disinfected, for in the course of the operation the surgeon's hand passes alternately into that canal and the abdomen. The usual abdominal incision being made, the uterus is enucleated and laid

on the abdomen, covering the lower angle of the operation wound. When fibromata occupy the lower segment of the organ the usual fragmentation is at once practiced; when, however, they are interstitial they are left untouched and the operation is proceeded with as follows: An interior peritoneal flap is fashioned by means of an incision across the anterior surface of the uterus, extending from one broad ligament to the other. The broad ligaments are thus liberated and thrown downward over the bladder. The left index finger is introduced into the vagina and the anterior *cul-de-sac* is incised with a large pair of scissors, the dissection of the vagina being pushed nearly as far as the sides of the os. Then, leaving the uterus *in situ*, the broad ligament on one side is seized by the hand quite close to the uterus, an opening in the posterior *cul-de-sac* is made with the point of the scissors, and through this orifice is passed, *per vaginam*, the posterior limb of Richelot's forceps, the anterior limb being thrust through the corresponding hole in the anterior *cul-de-sac*. The forceps is then thrust from the vagina from below upward, and, guided by the hand holding the broad ligament, is placed on that ligament. The same manœuvre is practiced on the other side by means of the second pair of Richelot's forceps, both ligaments being seized by the forceps and liberated from their extreme attachments. The uterus now hangs only to the posterior *cul-de-sac*, which is, in its turn, divided with a few snips of the scissors, and, as this section gives rise to hæmorrhage, three hæmostatic forceps are placed in position. A plug of iodoform gauze is inserted into the upper part of the vagina, none being placed in the abdomen. The abdominal incision is sutured and the operation is over. Of 5 hysterectomies thus practiced by Richelot, 4 being for fibromata and 1 for cancer, the first 4 mentioned were successful. The duration of the operation varies from thirty to thirty-five minutes, and no complications need be feared during the healing process.

Dührssen^{3 814}_{No. 21, '96; Sept. 16} has practiced vaginal cœliotomy sixty-four times for affections of the adnexa or old adhesions. The technique is simple. The uterus is drawn down with forceps, the *cul-de-sac* opened, and the ovaries and tubes drawn out, inspected, and removed, if necessary. But one death has occurred in the sixty-four operations, and that was due to hæmorrhage. The vaginal operation is indicated under the following conditions: 1. When ovaries, small cysts, or tubes (if they are partially movable) are to be removed. 2. In cases in which there are adherent ovaries, tumors, or tubes when the adhesions are not so thick that the diseased organs cannot be recognized.

The operation is contra-indicated (1) when the adhesions are

so thick and numerous that one cannot distinguish the different pelvic organs, and (2) when ovaries and tubes have formed firm attachments to the walls of the pelvis.

The advantages of the vaginal operation over the abdominal are: It exposes the patient to less danger during the operation; it avoids the danger of a ventral hernia, and it keeps the patient in bed a much shorter time.

H. Swiecicki,¹⁰² recommends Mackenrodt's method (opening of the *culs-de-sac* and separation of the bladder) in vaginal hysterectomy. The hæmorrhage is insignificant and the operation does not last long, owing to the employment of forcipressure.

In a discussion at the Hamburg Medical Society Schede and Wiesinger,¹¹⁵³ defended the sacral method as the only one suitable for advanced cases of uterine tumor. Schede has used only the sacral operation for five years, and, although many of the cases were desperate, his mortality was only 10 per cent. On the other hand, Prochownik and Lauenstein claimed that the vaginal in some cases and the abdominal in others were always to be preferred to the sacral method, whether this were the primary one of Kraske or that of Kocher, Heineke, Rydygier, or Schuchardt.

DISEASES OF THE TUBES.

Salpingitis.

Pathology.—J. G. Adami, of Montreal,²⁸² in an admirable review, states that, while under clinical conditions in which the symptoms are typical and point clearly to gonorrhœa there is no difficulty in confirming the diagnosis by bacteriological study, in doubtful cases, in which confirmation is of the greatest importance, there are many who hold that it cannot be given by the bacteriologist, inasmuch as there are other diplococci which simulate those of gonorrhœa, except by one test, but this one is impossible ordinarily,—namely, inoculation of the human healthy urethra. That these objections have some foundation is made manifest by the work of Turro⁵⁰ and Heiman.⁵⁰ Turro pointed out that the gonococcus grows upon sterilized urine, and that the cultures obtained upon slightly acid media (in place of the alkaline media usually employed) will, when inoculated into dogs, induce a catarrhal urethritis from which the gonococci are obtainable. If this were so, we had the means of testing the specific nature of diplococci occurring in doubtful cases,—a very ready means of completing the bacteriological diagnosis. Unfortunately, other observers—Wright, of Boston,⁵ and Heiman—repeating Turro's observations, have entirely failed to confirm them. But, in repeating them, Heiman obtained a diplococcus from cases of gonorrhœa,

growing upon Turro's media, of the same size as the gonococcus, but differing from it in not being decolorized by Gram's method. Now, the typical gonococcus, whether examined direct from the urethral discharge or obtained in pure cultures, is so decolorized, and Turro would appear never to have applied this important test. Hence the conclusion appears inevitable that the Italian observer, by his methods, isolated a non-specific form, and, indeed, Heiman found it to be harmless in man. Heiman examined the bacteriological fauna of the vulvo-vaginal tract in twenty apparently healthy children. In not one of them did he find a single diplococcus giving the reactions of the gonococcus, but, in cases where there was a slight mucous discharge and others in which there was simply enuresis, he found numerous pus-cells containing diplococci resembling the gonococcus in size, appearance, and all general characters save that they were not decolorized by Gram's method, while a pure culture from one case, inoculated into the healthy urethra of a youth of 17 years, produced no effects.

In three cases of vulvo-vaginitis, in two of which infection could be traced and the cocci were found in the parental discharges, Heiman found diplococci giving all the reactions of the gonococcus, and a pure culture from one of the cases inoculated into an adult male of 26 years, proved to be free previously from the disease, induced a mild attack of gonorrhœa with presence of the typical cocci in the urethral discharge.

The conclusion to be drawn is that the gonococcus can be diagnosed in discharges from both sexes by the following reactions: (1) the characteristic shape of the cocci and easy staining with ordinary aniline dyes; (2) their presence within the pus-cells; (3) decolorization by Gram's method of staining; (4) their capacity of setting up gonorrhœa when inoculated into the healthy human urethra. Of these characters the first two are common to other forms, the fourth can rarely be tested, and the third is the crucial test in ordinary. Herein Heiman's careful and valuable work confirms the most trustworthy previous observations.

The gonococcus is not limited in its growth to cylinder epithelium. G. Klein³⁴ has found it affecting stratified and peritoneal epithelium and even connective tissue,—in periurethral tissue, in the connective tissue of the Fallopian tubes, and even in abscesses of the ovaries. Thus the clinical picture of gonorrhœal disturbances in the female may include vulvitis, colpitis, salpingitis, oöphoritis, cystitis, peritonitis, and parametritis, while metastases due to the gonococcus present themselves in the form of monarticular arthritis in little girls, as in adults; of vaginitis, myositis, perineuritis, and even endocarditis in adults. From the above it

is very evident that instead of being the cause of a strictly localized disease, as was held until recently, the gonococcus is in itself capable of originating most of the lesions which used to be considered sequelæ and of secondary origin, but which now we find to be direct consequences of the lodgment of the specific virus in other regions.

W. R. Pryor ²⁴⁵ ⁹⁰ _{Mar., '98; Apr.} believes that gonorrhœa occurs frequently in women as a latent condition, which can become acute and be followed by the most disastrous consequences, entirely without fresh infection, and possibly as a result of any process which for the time decreases the resistance of the infected tissues. Bruising of tissues by confinements, operations, or violent coition may thus lead to the rejuvenation of the gonococci, an auto-infection, with acute attacks of gonorrhœal urethritis, vulvovaginitis, endometritis, and salpingitis, cases of which are quoted. The writer does not believe these latent conditions could start an infection of the male urethra until thus relighted. He examined the urethra, vagina, and cervix uteri of 197 prostitutes, the microscope alone being used and no cultures made. In the cervix he found the gonococcus in 31.3 per cent. In these cases there was marked purulent discharge in 2 only, redness in 1 case, and in 17 cases no symptoms whatever. In the vagina 180 out of the 197 women presented a vaginal discharge; but the gonococcus was found in only 7 cases, though many other forms of bacterial life were present. In the urethra 112 of the women showed gonococci. In 21 the disease was evident on ocular inspection, but in 91 cases the gonococcus was found with no pus-discharge. In 70 cases a follicular urethritis with discharge existed, but gonococci were not present. For the microscopical examination the discharge from the cervix was not alone used, but scrapings with Volkmann's spoon also. The author believes that in an overwhelming percentage of cases purulent urethritis and endocervicitis are due to gonorrhœa. The gonococcus seeks the racemose gland for its habitat, and we therefore find gonorrhœa as a latent disease in women in the compound racemose glands of the cervix, the vulvovaginal glands, and of the urethra. Dormant gonorrhœa may produce no changes which will allow of its recognition. In such a state it may become acutely virulent at any moment, so as to be communicated to other tissues of the woman, or to the male, or her child. He believes the prevalence of gonorrhœa is not due so much to neglected gleet in the male as to the uncured latent form in woman.

In the discussion of Pryor's paper C. W. Allen said that in an investigation which he had made some years ago he had found

the gonococci very frequently present in the discharges from the cervix and urethra. He constantly saw gonorrhœa in the male, originating from a gonorrhœa in the female of which the latter was apparently ignorant. Robert W. Taylor said that he did not believe that gonorrhœa was quite as prevalent among the higher orders of the middle classes as some would have us suppose. Werthheim and other German observers were particularly prone to extreme views on this point. He agreed with F. T. Brown, who had just described a case in which the acute symptoms were due to the existence of a posterior urethritis. P. A. Morrow thought that a latent gonorrhœa must assume an inflammatory type before it could become a source of contagion. Before anything was known of the gonococcus clinicians often asserted that leucorrhœa was a not uncommon source of urethritis, especially when such a discharge had been rendered purulent by excessive indulgence in alcoholic liquors or sexual intercourse. In his opinion, gonorrhœa was frequently communicated by women who apparently had no purulent discharge. Pryor, in closing the discussion, said that undoubtedly the immense venereal clinics from which the Germans drew their conclusions tended to make them extreme in their views regarding the prevalence of gonorrhœa. He believed that vulvo-vaginal abscess and urethritis were ordinarily due to the gonococcus. What was now designated as chronic purulent salpingitis was practically the same condition described in the male under the term "gleet."

The conclusion of Boinet ^{Nov. 3, '96} is that the pus of a salpingitis may be injected directly without results, but in a few hours may acquire a great virulence under favorable conditions. From this point of view sero-sanguinolent operative effusions may be compared and likened to veritable broth cultures, and, accordingly, drainage should be practiced after operations.

Raymond ^{July 14, '96; July 27} presented to the Paris Anatomical Society a characteristic specimen of gonorrhœal salpingitis. The fimbriated extremity of the left Fallopian tube was completely closed, while the right tube communicated through the same extremity with the pus-laden pouch formed in the peritoneum. This pus and that of the corresponding tube, as well as that of the left tube, contained gonococci. Under the microscope the pus presented all the characters special to its gonorrhœal origin (in the acute stage),—viz., numerous leucocytes without epithelial cells,—in fact, the pus revealed the same characters as that collected from the blennorrhagic urethra. In cases, however, of salpingo-ovaritis, due to the streptococcus, the pus contains only a few leucocytes associated with numerous desquamated epithelial cells. In streptococcic sal-

pingitis abscesses of the ovary are frequent, as are also spreading peritoneal lesions.

In a case of pyosalpinx operated on by Louis Frank ¹⁰¹³_{v.4, '96} a bacteriological examination of the pus revealed the presence of organisms resembling very much, in their morphological appearance, the diplococcus of pneumonia, though on account of the few slides made it was impossible to test them as to their staining reaction. Still, from their appearance, they were believed to be Fränkel's organisms.

Cullingsworth ²²_{Oct. 10, '94} points out that the form of pelvic inflammation with which small suppurating cysts of the ovary and ovarian abscesses are usually associated is not pelvic cellulitis, but salpingitis, the ovarian suppuration being due to secondary infection. An analysis of 83 cases, in which he had performed abdominal section for non-cellulitic suppuration, showed that ovarian suppuration formed a large percentage of the cases, being next to purulent salpingitis in frequency. Galabin, in the discussion of this paper before the London Obstetrical Society, concurred in the author's views, and emphasized the necessity of removing the whole of the ovarian tissue in such cases. Duncan suggested the necessity of curing endometritis in order to prevent an extension of the mischief.

Diagnosis.—J. F. W. Ross, of Toronto, ²⁷_{Nov., '94} admits that the diagnosis of cases in which there is but little to be felt in the pelvis is difficult, and such cases are likely to be mistaken for cases of so-called ovaritis and for cases in which the ovaries are tender, owing to some anæmic or other condition of the system. Neurotic women and anæmic girls frequently suffer from this ovarian tenderness. Such tenderness exists without the presence of any actual disease, and these cases should never be operated upon. If they are observed closely for a time no acceleration of pulse or rise in temperature will be noticed. The pus-tube may be mistaken for a fibroid, as has happened to the author himself. During the development of pus-tubes patients are usually supposed to be suffering from typhoid or malarial fever. The diagnosis in such cases should be made by the expert finger in the vagina.

Rabagliati ²²_{v.41, p. 389, '94}; ⁵_{May, '96} calls attention to the fact that myalgia of the abdominal and glutei muscles may be mistaken for pain referable to disease of the pelvic organs. Patients with the former condition complain of aching rather than sharp, smarting pains, while the sensitiveness felt on palpation is distinctly different from that elicited by pressure over diseased adnexa. Minor degrees of tubal and ovarian trouble may co-exist with the myalgia, but give rise to no symptoms when the latter is relieved. In favor of the

rheumatic origin of the muscular pains are the facts that they are frequently noted in women who have had acute or chronic rheumatism, that the latter affection often develops subsequently, the joint being affected in both, as well as the occurrence of cardiac complications. The writer gives to this form of myalgia in women the name "perimysitis rheumatica."

An undescribed symptom of pyosalpinx is mentioned by William C. Wood.¹ In every case of salpingitis coming under his observation the patient has complained of a severe pain over the region of the liver,—so severe, in some cases, as to lead to serious questioning on the part of the patient and her friends, and in one case on the part of counsel, as to the correctness of his diagnosis. He has never met with a mention of this pain in any text-book, yet its constancy seems to be more than a coincidence. It is due, he believes, to the reflex action resulting from pressure upon the pelvic nerves. He cites six illustrative cases, and has seen a number of others in which this pain was the subject of complaint and for which anodynes were required, when the pelvic pain was well borne. In some of them the diagnosis was confirmed by operation; in others no operation was performed.

Marx⁴³⁹ has several times observed perimetritis from vulvitis in infants, the symptoms precisely resembling those indicating acute inflammation of the appendages in the adult. A child subject to vulvitis, yet otherwise in good health, is suddenly seized with fever and nausea. Pain is felt in the hypogastrium, radiating along one or both thighs. Frequent desire to micturate and a pricking sensation when urine is passing are often felt. Rectal exploration with the little finger shows the characteristic deposit on each side of the uterus. Marx finds this physical symptom common, and believes that the tubes are generally involved in chronic vulvitis. In such a case the pain at puberty is very violent, and masturbation may light up old-standing inflammatory trouble. Old lesions of this kind are certainly liable to become acute in young, recently married women, through excessive coitus. It is quite a mistake to accuse the husband or to suspect that the wife has recently suffered from specific discharge in many such cases. The focus of the disease has often dated from early childhood.

Hartmann and Reymond, of Paris,⁴⁸ explain the rarity of torsion of the pedicle in salpingitis by the fact that in the latter the pedicle is generally broad and short, and that the tumor reaches to the uterine cornua. They observed a case of this kind in which operation showed the pedicle to be twisted forward to the right, the cyst being from the left uterine cornua. The symptoms

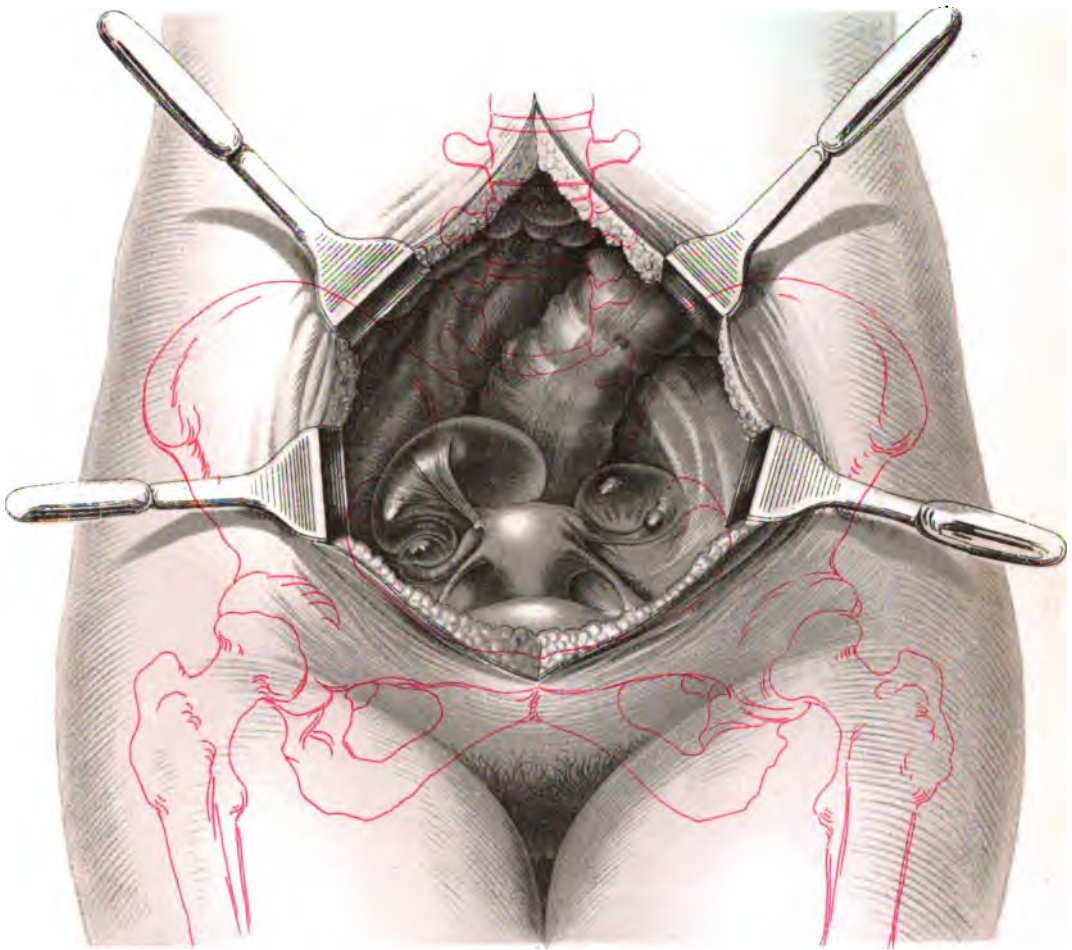
of twisting of the pedicle in hydrosalpingitis are exactly identical with those accompanying twisting of the pedicle in ovarian cysts,—hæmorrhage, evidences of peritonitis of a varying gravity, and, in more acute cases, symptoms absolutely simulating intestinal obstruction. This difference in evolution may depend upon the amount of torsion and upon whether it is gradual or sudden. In their patient, where the symptoms were subacute in character and progress, the vessels were not completely obliterated by the torsion, and the circulation, although interfered with, did not, according to the histological examination, appear to be entirely suppressed.

T. S. Cullen, of Baltimore, ⁸⁵⁸_{V. 4, Nov. 7, 8, '96} reports the results of twenty-six cases of hydrosalpinx operated by Kelly. Of these four were lost through purulent peritonitis. The author concludes that hydrosalpinx of itself is not, as a rule, dangerous to life, but the suffering in many cases is so intense that the patient is willing to undergo any risk for relief of the symptoms. There is always, however, a certain amount of danger which should make the surgeon hesitate before operating. On the other hand, if there is uncertainty as to the diagnosis, and this is usually the case, it is much better for him, if the symptoms warrant, to make an exploratory section. The article presents beautiful plates, the majority of which are herewith reproduced.

Explanation of Plates.—Plate I shows the uterus with a dilated and convoluted Fallopian tube on either side. The tubes are translucent, pass outward, then backward and inward, terminating in Douglas's *cul-de-sac*. Broad adhesions are seen stretching across from the right tube to the uterus. The same condition is present on the left side, but it is impossible to see them when this view of the pelvis is taken. In front of the uterine attachments of the tubes the round ligaments are seen passing downward and outward. Anterior to the uterus is the contracted bladder, posterior to it the rectum.

Plate II.—Fig. 1. Natural size. Hydrosalpinx simplex. The tube is markedly convoluted and the dilated fimbriated extremity is intimately adherent to the surface of the ovary. Fig. 2. Natural size. The tube does not present so many convolutions as Fig. 1, and where it is adherent to the ovary there are three glistening, subperitoneal cysts. Fig. 3 (natural size) is Fig. 2 on longitudinal section. The lumen is pervious to within a short distance of its uterine end. The folds of the mucosa are seen running parallel to the tube-axis and ending abruptly in little bulbous extremities. The dilated and occluded fimbriated end is intimately adherent to the ovary. Fig. 4. Dilated, occluded, fimbriated extremity of the tube filled with serous-like fluid. It will be noted that the tube is entirely free from adhesions, being in no way connected with the ovary. The opposite tube and ovary were densely matted together. Fig. 5. Natural size. The hydrosalpinx in outline. The tube is dilated to within a short distance of its uterine extremity, and contains a nodular, S-shaped calculus lying free in the lumen. The tube is intimately adherent to the ovary. Fig. 6. Natural size. Same as Fig. 5. It shows the appearance of the fresh specimen, the calculus being indistinctly seen in the interior of the tube.

Plate III.—Fig. 1. Tube in cross-section in a follicular hydrosalpinx, taken at the junction of its middle and outer thirds. Surrounding the lumen are many large and small cavities, round or pear-shaped. It will be noted that these spaces are more dilated on the free, convex, upper surface than on the under surface, which is attached to the parovarium. (Leitz dissecting microscope. Ocular 8. Hæmatoxylin and eosin.) Fig. 2. A portion of Fig. 1 more highly magnified. The peritoneal coat is covered



Uterus with translucent, dilated and convoluted
Fallopian tube on either side. (T. S. Cullen)

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PLATE II.



Fig. 1.



Fig. 2.



Fig. 3.

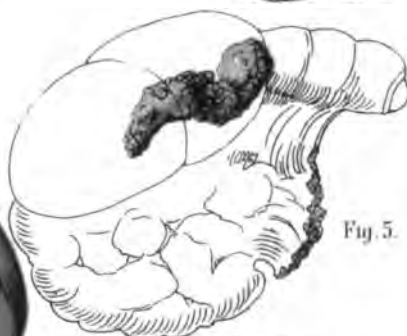


Fig. 5.



Fig. 6.

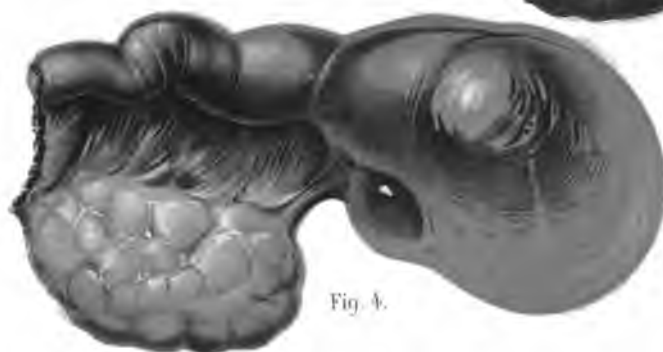
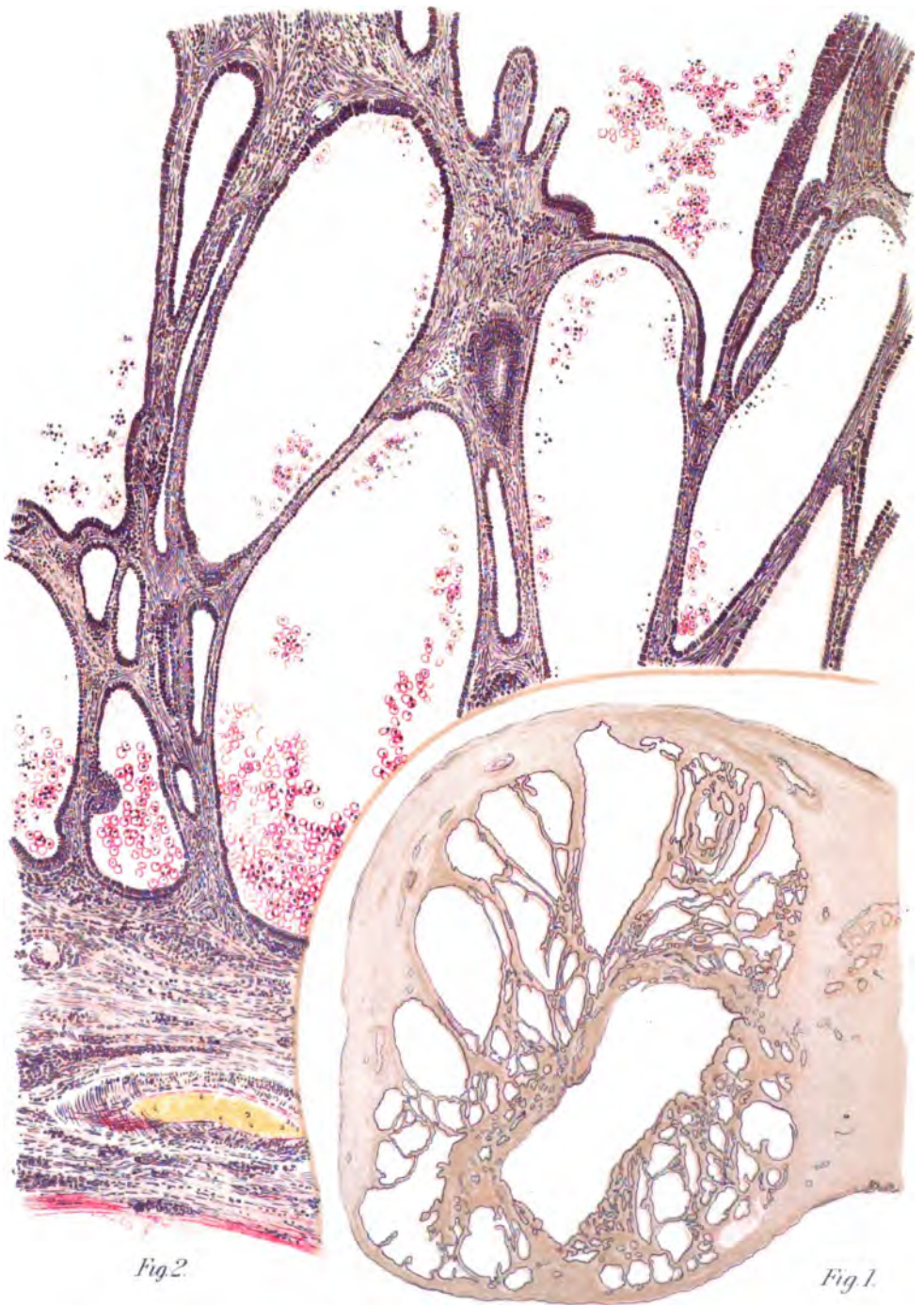


Fig. 4.

Hydrosalpinx Simplex. (T S Cullen)

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Tube in cross section in a follicular hydrosalpinx.(T.S Cullen)

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by a few very recent adhesions. The muscular coat has almost entirely disappeared, its place being occupied by connective tissue. The small "alveoli" are lined by cylindrical epithelium, the larger ones by cuboidal epithelium, which, however, in protected places is cylindrical. The lumina contain a moderate amount of desquamated epithelium. The stroma is almost identical with that of the normal tube. (Winckel. Obj. 3. Ocular 1. Hæmatoxylin and eosin.)

Treatment.—In his report of the gynæcological service at Mt. Sinai Hospital Paul F. Mundé⁵⁹_{Oct. 19, '98} states that salpingitis, acute or chronic, more or less associated with chronic oöphoritis, occurred 651 times, with 75 recoveries after removal, 41 cured after local treatment without operation, 512 improved after palliative local treatment, 22 unimproved, 1 death after operation. It would have been very easy for him to have operated on probably 500 of the 651 cases, but he did not believe any patient had seriously suffered through delay in removal of the appendages for which he might have been to blame. When it came to distension of the tube with pus the case was quite different, for out of 40 cases recorded he removed the diseased organs by cœliotomy in 26, with 21 recoveries, and cured 11 others by vaginal incision and drainage. As a rule, he preferred to remove every pus-tube by abdominal section, unless it was firmly adherent to Douglas's pouch, was unilateral, and could be easily and safely opened and drained by the vagina.

Quénu, of Paris,¹¹⁵³_{July 4, '98} states that in choosing the operation it is best to reserve vaginal hysterectomy for cases in which palpation shows that the lesions are bilateral. Under such conditions it is the state of the uterus rather than that of the appendages which decides the choice of operation; if the uterus is movable, laparotomy is indicated; if it is not movable, hysterectomy is necessary.

J. B. S. Holmes, of Atlanta,⁶¹_{Dec. 16, '94} makes a strong plea against curettage in the presence of pus-tubes with pelvic adhesions. Auvard²³⁶_{June, '96; Aug. 17}² strongly objects to the use of the curette in the course of acute gonorrhœa. Theoretically, the practice seems justifiable, but experience has proved that it is one of the surest ways to cause extension of the disease to the tubes and ovaries. After the use of the curette a minute piece of infected glandular tissue may be left behind. The entire surface of the uterine cavity may be disinfected by and after the scraping, yet then the mucosa, which acts as a rampart against microbic infection, has been destroyed.

[See treatment of endometritis for further information upon the dangers of curetting, F-19.]

Hofmokl⁸_{May 22, '96; July 18}² states that many cases in which inflamed appendages had been removed have come to him with untoward

after-results, due to suppuration of the stump and consequent discharge of the ligature, or to adhesions between the omentum and the stump, or to intestinal obstruction from adhesion of the bowel to the stump or to the abdominal wall at the cicatrix of the operation wound. Fæcal fistula is not unknown. Out of 216 operations for diseased appendages 13 died, 2 from somewhat late pulmonary complications, but 11 from causes directly connected with the operation. On the other hand, out of 100 cases of aspiration or incision through the posterior vaginal fornix none died. In parametritis, perimetritis, and hæmatocele the results were excellent. Hofmokl therefore maintains that, in confirmed diseases of the tube or in cases where pus or blood has collected in the pelvis without any serious complications having developed, aspiration should be practiced as early as possible. The appendages usually resume their normal functions and the patient is saved from mutilation.

In a discussion on inflammatory disease of the uterus and appendages, George H. Rohé, of Catonsville, Md.,⁶¹_{Oct. 13, '94} said that conservative surgeons were very much shocked, at first, by the proposition to remove the uterus, together with the adnexa, in cases of inflammatory disease in the pelvis. However, the operation has won its way against opposition and must now be considered as an elective procedure in cases of extensive suppuration with adhesion, and especially in those cases so numerous in which the endometrium is likewise the seat of purulent inflammation.

Jacobs, of Brussels,²⁷_{Nov., '94} makes a strong plea in favor of vaginal hysterectomy. His total mortality in 255 cases is only 1.96 per cent. Although his operations were originally confined to cases inoperable by the abdominal method, he now regards total extirpation *per vaginam* as the ideal method for all cases in which it is necessary to remove both tubes and ovaries. Among his patients were many who had previously submitted to palliative operations, or even to abdominal castration, without relief.

E. E. Montgomery, of Philadelphia,²⁷_{Dec., '96} enumerates the advantages of the vaginal route as follows: 1. It permits us to explore, treat, and preserve organs which would otherwise be sacrificed. 2. It promotes drainage from the most dependent portion of the pelvis and enables the large peritoneum to be protected by plastic barriers. 3. It enables us to remove the uterus and appendages with less danger and more subsequent comfort than if the abdominal incision had been practiced. 4. The adhesions which nature has provided to protect the vital organs are undisturbed, and there is less likelihood of subsequent obstructive symptoms. 5. Convalescence is shorter, and the patient avoids such annoying

sequelæ as abdominal sinus, painful cicatrix, weakened ventrum, and ventral hernia.

In the discussion which followed the reading of this paper, Baldy, Noble, and Baer expressed their preference for the abdominal method. Baldy insisted especially upon the fistulæ following many vaginal hysterectomies, even in the hands of the best operators. Noble considered that there was a proper field for a vaginal operation in bad cases of pelvic suppuration, but not in hysterectomy. Baer objected to the vaginal method on account of the necessity of treating the wound as an open one and because of the incompleteness of the operation, which causes prolongation of the convalescence.

J. Henry Carstens, of Detroit, ¹_{Sept. 21, '96} expresses his opinion that in cases of bilateral pyosalpinx a more perfect and complete operation could be performed by abdominal section, with less danger of injury to the bladder and intestine, and with a smaller mortality and better ultimate results. In certain cases a better immediate result is obtained by vaginal hysterectomy and drainage; but these cases frequently require a second operation to remove the ovarian tissue and parts of the tube which at first in many cases could not be removed before a perfect ultimate cure is established. When the sympathetic and other nerves are affected the cause is not in the uterus, the ovaries, or the tubes alone, but partly in each, and we are unable to state which organ was at the bottom of the trouble. In many cases with marked nervous symptoms the best results are obtained only after the complete removal of every particle of the generative organs,—uterus, tubes, and ovaries,—whether at one, two, or three operations, *per vaginam* or by abdominal section. In the discussion, R. S. Sutton, of Pittsburgh, also favored vaginal section. He maintained that a uterus deprived of its appendages was of no use, and that it was, if left, liable to tuberculosis, gonorrhœa, syphilis, adhesions, etc. When it was decided to remove the appendages the uterus also should be taken out. Henry O. Marcy, of Boston, favored retaining the cervix if healthy, because it acts as a support for the vault of the vagina. (See "Hysterectomy" and "Cœliotomy," F-40 and F-77.)

F. A. Glasgow, of St. Louis, ⁹_{Oct. 6, '96} calls attention to the fact that the tubes, so far as his observation goes, are always pervious at the outer extremity of the cornu; hence gonorrhœal inflammation is not an adhesive inflammation, and therefore it does not follow that the tubes have a true atresia following this inflammation. A closure may be due, however, to a swelling of the endometrium, but when this inflammation and swelling are overcome by pressure and antisepsis the tubes become patulous again. Intra-abdominal

pressure will cause fluid in any pendent portion of the tube to ascend into the uterus. The entire tract may thus be opened by dilating the uterus either by gradually packing with gauze without anæsthesia, rapidly dilating the cervix and packing with gauze after curetting, or dilating by means of antiseptic or sterilized elm-bark tents.

Llewellyn Eliot, of Washington, ²⁷_{Oct., '94} claims it is possible to catheterize the Fallopian tubes, and, the possibility being established, the attempt to treat cases of diseased tubes by applications made directly to their surface is justifiable. In order to pass a sound into the tube it is evident that the tube must be large enough to admit the sound without the use of force; and no sound or probe less than one-eighth of an inch in diameter at the point should under any circumstances be used, as the danger of passing it through the uterine wall would be too great. Tubal catheterism should never be attempted by any one unfamiliar with the pathological anatomy of tubal disease as learned from post-mortems and operations.

Pozzi ⁵⁵_{July 18, '96}; ²_{Sept. 7} reports a case in which the cervix had been amputated and complete atresia resulted through want of care in keeping the canal open. Double hæmatosalpinx, due to retained menstrual fluid, was the result. Pozzi removed the appendages through an abdominal wound. Symptoms of suppuration in the uterus set in. The uterus was therefore amputated. Three injections of antistreptococcous serum were given, as serious septic symptoms followed the third operation. Recovery took place and the patient regained her health.

When the gonococcus has been detected in the secretion, Cumston, of Boston, ²⁸_{June, '96} states that a urethral and vesical irrigation should be made with a solution of permanganate of potassium. The strength of the solution should vary from 1 per 1000 to 1 per 2000, according to the given case, and the quantity of each irrigation should be at least 1 litre (quart). The irrigation should be practiced every day for ten to fourteen days. In a later stage of the disease he irrigates urethra and bladder with sublimate solution of the strength of 1 in 20,000. In the third stage, when the secretion contains only cells of epithelium, leucocytes, etc., he uses ichthyol in a solution of 1 per cent. This is introduced with a syringe.

Tuberculous Salpingitis.—Percy Ashworth, of Manchester, describes ²_{Apr. 3, '96} a case in a woman who had a tuberculous husband. When seen, seven months before death, the patient was greatly emaciated and the abdomen was filled with fluid. After tapping, a hard mass was found in the pelvis. She was tapped twenty-one

times in all; at the thirteenth tapping a hard nodule was discovered in the abdominal wall, at the seat of puncture. Post-mortem this nodule was found to be a piece of tuberculous omentum adherent to the abdominal wall; the intestines were studded with tubercle and the pelvis contained a large mass, from the midst of which the two thickened and dilated Fallopian tubes filled with thin pus could be isolated. There was no doubt that in this case the tuberculous mischief commenced in the Fallopian tubes, and the interesting point was: whether the infection had thus been communicated by the tuberculous husband.

Hugon, of Bordeaux, ¹⁸⁸_{June 20, '95} also reports a case of probable metastatic salpingitis in a girl, 18 years of age, who also suffered from articular tuberculosis of the knee. Gérard Marchant, of Paris, ¹⁴_{Nov. 18, '94} successfully operated on a case, generalization not having taken place at the end of three years. Penrose and Beyea report ⁵_{Nov., '94} five cases of tuberculosis of the Fallopian tube found in a series of twenty-five abdominal sections for pelvic inflammatory trouble,—a large percentage. All the five patients had been sterile, though four were married. In this respect these histories differ from those of ordinary cases of non-tuberculous salpingitis, where, in the great majority, there is a history of at least one child or miscarriage before the disease reaches such a stage as to render the woman sterile.

Wahlstrom ¹⁰²_{Sept. 25, '95} describes a case in which removal of the appendages disclosed the fact that there was extensive tuberculous peritonitis, especially toward the pelvis. The patient regained her health after the operation, but died ten months later, when a post-mortem examination showed that the tuberculosis of the peritoneum had disappeared.

Condamin, of Lyons, ³⁰⁴_{May 28, '95} basing his conclusion on one case, proposes to substitute vaginal for abdominal laparotomy in pelvic tuberculous peritonitis with or without involvement of the tubes. Vaginal operation, with extensive drainage, permits of modifying the tuberculous lesions by means of iodoform-gauze dressings. Abdominal laparotomy is more difficult in these cases and sometimes even impossible.

Ectopic Gestation.

Pathology.—Muret ¹⁹⁷_{July 30, '95} states that the termination of tubal pregnancy during the early months is little recognized, but is nevertheless frequent, and perhaps more frequent than rupture of the gravid tube. The abortion takes place suddenly, the ovum being expelled into the abdominal cavity with corresponding symptoms more or less marked. Uterine decidua are expelled,

and a small intra-peritoneal hæmatocele is formed, which gradually disappears. Edebolis, of New York, ²⁷_{Jan. '96} reports a case in which he removed a tube from which an ectopic ovum was in the act of passing through the abdominal ostium of the tube, about one-third of it being in the abdominal cavity, the remaining two-thirds still within the tube. There was no rupture of the tube-wall. Piering ⁸¹⁷_{No. 22, '96}, ²_{Sept. 21} has recently exhibited before a German society a specimen illustrating tubal pregnancy which had ended in abortion at the fourth week. The ovum was discovered, quite uninjured, among clots in Douglas's pouch, and the ampulla of the tube showed, under the microscope, all the signs of ectopic gestation. Though the abortion was complete, internal hæmorrhage was so severe that an operation had to be performed. The patient recovered. This case proves that surgical interference is needed in complete, just as in incomplete, tubal abortion.

G. Tainturier ²⁰⁰⁰_{Nov. 17, '94} finds the old theories as to the pathogeny and etiology of extra-uterine pregnancy obscure and insufficient in many cases. To the purely mechanical causes which may arrest the impregnate ovum, must be added a previous pathological lesion, for, according to Tainturier, the grafting of the ovum can only take place on tissues modified in their structure and vascularization by a more or less recent inflammation.

W. S. A. Griffith ²_{Nov. 17, '94} reports a case of extra-uterine gestation in which a large uterine cast was passed from the vagina. It was identical with those found in cases of extra-uterine gestation and showed characteristic decidual cells. The woman's abdomen was opened and no evidence of extra-uterine gestation was found. The author considered the case capable of explanation in one of two ways: either the uterus was capable of developing the decidua, which are believed to be the result of fertilization of an ovum alone without this stimulus, or, as appeared to him less improbable, a fertilized ovum might have provided the necessary stimulus either inside or outside the uterine cavity, but have completely disappeared. He was of opinion that in future a cast should be regarded as evidence of the highest value instead of as conclusive of extra-uterine gestation.

In a case of tubal-mole pregnancy reported by Hiram N. Vineberg, of New York, ¹_{Mar. 21, '96} the points of clinical interest are: 1. The misleading character of the first attack. 2. The early hæmorrhage into the decidual membranes, this having probably taken place as early as the second or third week of gestation. 3. The recurrence after the death of the ovum of two attacks of intra-peritoneal hæmorrhage at an interval of three and six weeks, respectively. 4. The occurrence of ectopic gestation in a woman

who presumably had healthy pelvic organs and who had given birth to a child at full term only two years before.

Diagnosis.—M. Hofmeier,²¹⁴² in a monograph based upon fourteen cases, insists upon the value of a sign indicated by Veit, —viz., that pulsation on one side of the tumor is often observed to be greater than on the opposite side. This sign is of especial value in indicating whether the fœtus be alive or not. Hofmeier, by this means, correctly diagnosed extra-uterine pregnancy in three cases; in two others the sign was present at first, but disappeared with the death of the fœtus.

J. E. Janvrin, of New York,⁶¹ states that, in addition to the usual early symptoms of pregnancy, there is a tipping of the uterus laterally, an elastic swelling at the site of the ovum, and an exquisite tenderness at this point.

Irving S. Haynes, of New York,¹ emphasizes the fact that the examination is more satisfactory when the patient is in an unconscious state, and that physical conditions not manifest when she is conscious may be very distinct then. The absolute demonstration of tubal pregnancy is possible only by an exploratory cœliotomy. This operation is practically without risk,—at least, it is to be preferred to a continuance in a state of uncertainty regarding the exact diagnosis, since the danger of rupture is so great in case there is a fecundated ovum in the tube.

Delaunay⁷ performed hysterectomy for what was supposed to be a fibroma of the fundus, but which proved to be a tubal gestation.

Indications for Operation.—J. A. Shaw-Mackenzie, of London,⁴⁹ says that it seems reasonable to operate with greater possibility of success to the mother after the death of the fœtus, and if possible to delay till three months after its presumed death; if constitutional symptoms or the necessity for a live fœtus determine operation, then the placenta must be left and sepsis risked, unless it is clear that it can be removed without hæmorrhage. Recent research, however, has shown that primary abdominal section in advanced ectopic gestation (that is, section during the life of the fœtus) has proved successful to mother and child in a considerable number of instances. So that we may require to modify our beliefs regarding the best elective operation in such cases.

Successful cases of faradism, of puncture and aspiration of the primary gestation-sac *per vaginam* are on record, but such treatment, except with a view to destroy the life of the fœtus, must be deemed unscientific. Removal of fœtal remains through a vaginal sinus or incision can rarely be as satisfactory as *per abdominal* section, except possibly where the fœtus has died early

and the sac small and communicating freely with the vagina, allowing free drainage and flushing; even then the placenta cannot easily be reached or its site diagnosed, and we have a less complete command than by an abdominal section.

Paul F. Mundé⁵⁰_{Oct. 19, '96} reports that in his service at the Mt. Sinai Hospital, during 1894, in fifteen cases the Fallopian tube was removed for pregnancy, before or after rupture, with thirteen recoveries. He is no longer a convert to galvanism for the arrest of tubal pregnancy, although he had had a successful case of the kind twelve years ago. S. L. Jepson, of Wheeling, W. Va.,²⁷_{Sept., '96} states that electricity—preferably galvanism—should be used when a diagnosis is made before rupture, unless the patient can and will secure the services of an expert operator, but that cœliotomy by an experienced abdominal surgeon is always proper in early unruptured cases. A. Laphorn Smith operates as soon as the diagnosis is made and regards the operation as one of the easiest of the abdominal operations.

Rupture of Tubal Sac.—In a report based on sixteen operations for extra-uterine pregnancy, Rufus B. Hall,²³_{Sept., '96} of Cincinnati, remarks that the clinical history in individual cases differs in many particulars from that which has been laid down by older writers upon this subject.

They emphasize the fact that a great number of the ruptured tubal pregnancies occurring in the early months of gestation are just as likely to rupture into the fold of the broad ligament as into the peritoneal cavity. If the rupture take place into the broad ligament, the continued bleeding dissects up the pelvic peritoneum, causing extra-peritoneal hæmatocele. The loss of blood is thus limited, and nature's effort will be all-sufficient to cure the patient; so that no operation will be required. He is of the opinion that not a few of the recoveries reported as rupture into the broad ligament are really rupture into the peritoneal cavity. In a number of cases reported, if the diagnosis had been based upon evidence, rupture into the fold of the broad ligament would, with the one exception noted, have been decided upon. Subsequent operation upon these very cases demonstrated the fact that they were intra-peritoneal. This deceptive condition is fraught with grave danger to the patient if it cause her attending physician to hesitate or falter, as it usually does, in his advice favoring an operation. Furthermore, in not a single instance was there anything like extra-peritoneal rupture, but, on the contrary, in every case the rupture took place on the free border of the tube, and the bleeding was in the peritoneal cavity from the first. The author is convinced that all of these patients should be carefully

watched, with the idea of performing immediate cœliotomy if alarming symptoms are developed, which might follow rupture of the peritoneal covering, converting it into an intra-peritoneal rupture.

Henry D. Ingraham, of Buffalo, N. Y., ¹⁷⁰_{Aug. '96} gives a clear outline of the signs furnished in a given case. He is of the opinion that, when any woman, who has menstruated regularly and who has passed her period from four to twelve weeks, is suddenly seized with pain in either iliac region, becomes faint, dizzy, nauseated, pale, generally unable to sit up, tender and sensitive over lower part of abdomen, having a frequent desire to go to stool without being relieved, and when, upon vaginal examination, a boggy mass is found at one side and posterior to the uterus, and a slight, bloody, shreddy, mucous discharge occurs, she has the classical symptoms of a ruptured tubal pregnancy.

Rochet ¹²⁶_{Apr. 15, '96} gives the details of four cases in which there was severe internal hæmorrhages, and states that such hæmorrhages are nearly always from the appendages. Cases with any other origin are exceedingly rare. Alban Doran ⁶_{Apr. 6, '96} points out that the arteries in a tubal sac bleed very freely and the hæmorrhage does not tend to stop spontaneously. The vessels in adherent structures outside the sac, on the other hand, do not seem to share in this undesirable peculiarity; indeed, they do not bleed more than in adhesions to malignant pelvic tumors.

Maurice H. Richardson ⁹⁶_{Dec. '94} discusses the diagnosis and treatment of extra-uterine pregnancy and pelvic hæmorrhage, based upon a study of twenty-four cases. The mortality in cases of pelvic hæmorrhage depends, first, upon the amount of blood lost and, secondly, upon the profundity of the shock. Death due to loss of blood alone is, in his experience, extremely rare. For some reason the extravasations from a ruptured foetal sac are attended by a shock which is out of all proportion to the amount of blood lost. In such instances the patient suffers not only from the loss of blood, but also from the extensive wounding of the peritoneum,—the so-called peritoneal shock. In these cases there are not only the signs of hæmorrhage, but also those of great systemic depression. In fatal cases of this kind death takes place in the course of a few hours.

When there is good reason to suspect a faulty pregnancy in its early development he advises immediate exploration, for the sole reason that a few minutes or a few hours may place the patient beyond the reach of aid,—an accident that can by no means be predicted.

The mortality in deliberate operations upon well-prepared

patients in good condition, at the hands of an experienced operator, is very small indeed; that of operations of urgency considerable. Practically, all cases must be operated on at one time or another. Hence it is obvious that early operation is always desirable in doubtful as well as in certain cases.

Egbert H. Grandin, of New York, ⁵⁹_{Nov. 9, '96} before the New York Academy of Medicine, announced his conversion from the erroneous doctrine which for years he, in common with many others, had promulgated,—the doctrine that ectopic gestation might very properly, from the eighth to the tenth week, be treated by non-surgical means, particularly electricity. Experience had taught him that even before the eighth week there might be hæmorrhage of a slowly progressive character. Thus, in a number of cases where the symptoms had not been very urgent, abdominal section had shown free hæmorrhage and old clots. Wider experience had taught him to accept the view enunciated by Janvrin, that so-called colicky pains in these patients were, in fact, signals of hæmorrhage; further, that women might bleed internally even though there had been absence of colicky pains. Hence he had ranged himself in line with those who claimed that in the presence of diagnosis of ectopic gestation immediate section should be the rule.

[Ectopic gestation at any stage should be regarded in the light of malignant disease and as demanding operation as early as the exigencies of the case will permit. In this form of pregnancy the life of the mother should alone be considered. Alarming, even fatal, hæmorrhage has been known to occur as early as the fifth week. The danger from shock is so great that rupture should not be awaited where the diagnosis has been determined. —E. E. M.]

Henry C. Coe, of New York, ²⁷_{Apr., '96} presented to the New York Academy of Medicine a specimen of tubal pregnancy, illustrating the danger of delay. The patient gave a history of having missed one period and thought she was pregnant. The night before, when her period was due, she had very severe abdominal pain. On examination, some hours later, Coe found a small uterus, but an enlarged left tube. That was all, and there were no subjective symptoms at this time, the pulse and temperature being normal. He made the diagnosis of possible ectopic pregnancy, and requested to be notified at once in case symptoms arose. Symptoms did arise that night, but they failed to notify him until the next afternoon, when she was practically moribund. He gave an absolutely bad prognosis, but operated, found the abdomen full of blood, and death occurred soon afterward. He believed that if he

had insisted on operating when he first saw the patient her life would have been saved. In the discussion of Coe's paper Nammack thought the cause of delay was the teaching of the books that the hæmorrhage might take place into the broad ligament instead of into the free cavity, and become shut off and cause no further trouble. An unfortunate experience of the same kind is related by H. M. Silver.¹_{Dec. 10, '94}

[At the Jefferson Hospital Clinic the writer examined a woman who had a small mass to the left of a retroverted uterus, in which pulsation as distinct as over the radial artery was apparent. Ectopic gestation was recognized. Less than ten minutes subsequently he was called to see her in a state of collapse. Immediate operation was urged, but over an hour transpired before permission could be secured. The abdomen contained a quart of blood, and the patient soon expired.—E. E. M.]

Wallace A. Briggs, of Sacramento, Cal.,¹⁴⁷_{Nov., '94} employed saline infusion while performing cœliotomy in the case of a ruptured tubal pregnancy, 20 ounces (630 cubic centimetres) of normal saline solution being injected into the thighs and a somewhat larger quantity into the rectum. The patient held up unexpectedly well, her pulse improving considerably during the operation, probably on account of the saline injections. The highest temperature following the operation was 100.5° F. (38.1° C.), in consequence of a small abscess developing at the site of one of the intra-cellular injections. The stitches were removed on the eighth day, union was perfect, and the subsequent history of the case uneventful.

A series of extra-uterine pregnancies are recorded by J. Anderson Springle, of Montreal.²⁸²_{Mar., '96} In one case compression of the aorta was most effectual in arresting hæmorrhage, and the author expresses regret that this means has not been more employed, especially in controlling post-partum hæmorrhage. It was recommended by Bishop,⁶_{and} for the past three years the writer has used it with invariably good results.

[Pressure over the aorta cannot well be made above the origin of the ovaries and arteries; hence its application must be of doubtful utility.—E. E. M.]

Atypical Cases.—Zemann,¹⁴_{Feb. 27, '96} showed to the Vienna Medical Society specimens from a case of extra-uterine pregnancy, interesting from the fact that the fœtus had been able to develop for six months in the right Fallopian tube, attaining a considerable size, and that after its death it had remained 11 months longer in the sac. The fœtus had partially undergone fatty degeneration, had become infected from the small intestine, and suppurated, the woman dying of peritonitis.

W. F. McNutt, of San Francisco, ⁷⁷_{Dec., '94} reported a case of abdominal pregnancy complicated with a fibroid of the uterus. The abdomen was opened, the child found living and removed, supposedly at full term. The mother died on the second day. Schwartz reports ³¹⁷_{Nov. 20, '95} a case of ectopic gestation with rupture of hæmatocele into the bladder. Ekehorn ⁶⁷³_{Aug., '95} reports a case in which tubo-uterine pregnancy occurred twice in succession, and Houzel ⁴⁸_{Sept., '94} one in which the placenta was inserted in the intestine.

Djemil-Bey ⁴⁸_{Nov., '94} successfully removed an extra-uterine lithopedion of 3 years' standing. A case of the same kind was successfully operated upon by Anna Lydia Church. ⁶_{Mar. 11, '95} There was much ill-defined thickening to the right of the uterus. The patient, at the time of report, had had two normal periods since leaving hospital. Two cases of ectopic gestation with retention of the fœtus for 8 and 13 years, respectively, followed by operation and recovery, are reported by Mathew D. Mann, of Buffalo. ¹⁷⁰_{Aug., '95} Folet, of Lille, reported ¹⁰_{Mar. 12, '95} an extraordinary case of twin tubal pregnancy with retention of the fœti for fifteen years. Recovery was complete in six weeks after operation.

Tumors of the Broad Ligament.

Fibroma.—From the stand-point of treatment, Vautrin, of Nancy, ⁸_{Nov. 6, '95} divides fibroids of the ligament into three varieties: (a) those with a pedicle, to be treated by ligature of the pedicle, followed by excision of the growth; (b) fibroids of medium size, to be treated preferably by enucleation; (c) large fibroids generally filling the pelvis and encroaching on the abdominal cavity, to be treated by total abdominal hysterectomy. He recently performed this operation for a very large ligamentary fibroid in a woman, 47 years old, who also had a partially irreducible umbilical hernia. She left hospital in one month, fully recovered.

Funck-Brentano and Robineau ⁷_{Dec., '94}; ²³_{Mar., '95} also report the removal of a fibroma of the broad ligament from a patient, aged 38, in Nélaton's service at the Hôpital Tenon. This woman had always menstruated regularly and had never shown any functional symptoms in relation to the enormous abdominal tumor which rendered walking difficult. Palpation, percussion, and vaginal examination showed that the tumor extended from the xyphoid appendix to Douglas's *cul-de-sac*. Operation was quite easy and presented nothing particular to note, excepting an adhesion behind with a coil of intestine. The uterus, being adherent, was cut off above the cervix, the latter being drawn up and sutured to the inferior lips of the wound. The left adnexa were removed. The right ovary, which was cystic and the size of an orange, was

adherent to the tumor. Examination of the specimen showed that it was a fibroid. These cases present special interest owing to their rarity. Barton Cooke Hirst, of Philadelphia, ²⁷_{July, '96} in a paper read before the College of Physicians, stated that a myoma in the broad ligament, independent of the womb, is one of the rarest of all pelvic tumors. Some well-known gynæcologists have denied its existence, but in all recent works on gynæcology the possibility of myomatous growths from the ovarian and round ligaments is admitted, though most of the authors evidently have not themselves seen the condition.

Tumors of the Round Ligament.

Witte ³¹⁷_{No. 34, '96} ¹¹⁷⁰_{Sept., '96} reports a case of fibrolipoma of the left round ligament in an unmarried woman 34 years of age. Two years before she had complained of severe pain in the left inguinal region, which was somewhat enlarged. The diagnosis of inguinal hernia was made, and a bandage or hernial truss recommended. The pain persisted and the swelling increased, and an operation was eventually advised. Since, at the same time, there existed an ovarian cyst, a laparotomy was performed. When the cyst had been removed, one could feel a tumor lying at the edge of Poupart's ligament. It was as large as a hen's egg and seemed bound to the uterus by a long, slender, and muscular pedicle,—the round ligament. It was ligated off and an uneventful recovery followed. Microscopical examination showed that a collection of nodosities constituted the tumor, which was poorly supplied with blood-vessels. The tissue-substance was composed of muscle-fibres, some connective tissue, and much fibrous and fatty tissue; hence a fibrolipoma.

DISEASES OF THE OVARIES.

Ovarian Abscess.

Von Rosthorn ⁸⁸_{No. 1, '94} ¹¹²_{Apr., '96} describes a case in which he found the pneumococcus in the pus of an ovarian abscess, and states that he has been able to find only two cases reported in the German literature (Zweifel and Frommel) and one case in the French literature (Morax) in which the same organism was found in the pus of a pyosalpinx. Heywood Smith ⁴⁹_{Feb., '96} presented to the British Gynæcological Society a specimen showing left tubo-ovarian abscess with right pyosalpinx. Langer, ⁸⁸_{No. 10, '96} in four specimens of undoubted abscess of the ovary, found that the abscess-wall was lined with cells bearing all the characters of those of the membrana granulosa in the degenerative stage, when the corpus luteum is developed. The author states that this kind of abscess is caused

by direct suppuration of a corpus luteum, and that he does not consider it as the result of suppuration of a corpus-luteum cyst, which is itself a pathological condition. Abscess of the ovary would seem to be a primary disease associated with menstruation or pregnancy.

Cysts.

Simple Cysts.—Fränkel⁹⁵_{B. 48, H. 1, Feb., '96}⁵ has made careful microscopical studies of cysts of the corpus luteum, which are distinguished by the following peculiarities: Macroscopically the cyst-wall presents a yellowish color, is thrown into folds, and can be peeled off from the subjacent tissue. The contained fluid is either thin or syrupy in consistence and of a reddish-brown or yellow color. Under the microscope the lining membrane is seen to be rich in capillaries, between which lie large multinucleated pigment-cells and groups of leucocytes. That these cysts possess considerable clinical as well as pathological interest is evident from the number of cases in which they have given rise to such symptoms as to demand surgical interference. It is not always possible to decide whether the accompanying pelvic peritonitis is the cause or the result of the cyst-formation. The writer decides from his investigations that large, apparently unilocular, ovarian cysts may undoubtedly arise from the confluence of adjacent dilated follicles. A combination of multilocular glandular cystoma with cysts of the corpora lutea has also been noted.

C. B. Penrose, of Philadelphia,²³⁴_{Oct., '94} strongly recommends the bacteriological examination of all the contents of abdominal cysts at the time of the operation, so that, should the contents escape into the peritoneal cavity, the operator can at once decide whether it be necessary or not to drain for sepsis. Out of a series of forty-six laparotomies in which this examination was made, in only one was it found necessary to drain on account of septic contents, and in no case peritonitis or sepsis supervened. He supports, therefore, the results published by Schauta, that the tubal contents in the majority of cases of salpingitis are sterile, and concludes by stating that he considers no operating-room complete without facilities for bacteriological examination.

J. Bland Sutton, of London,²²_{Aug. 14, '96} describes a case which presented, as interesting features: (1) the unusually rapid growth of the tumor, for it really could be seen to increase in size daily; (2) the profuse menorrhagia. Interference with menstruation, he said, was so rare an event in association with an ovarian tumor that it led to difficulty in the diagnosis. That the bleeding depended in some way on the tumor was shown by the circumstance that it

ceased immediately after the operation. Delaunay⁷_{Jan., Feb., '95} describes two cases of metrorrhagia in ovarian cystic disease, after the menopause. Rein¹⁶²_{Mar. 25, '95} presented to the Obstetrical Society of Kieff a child of 6 years with cyst of the ovary.

J. Bland Sutton²²_{Oct. 10, '94} operated on a woman, aged 40, for abdominal distension with free fluid in the abdomen. The fluid in this case was not effused from the peritoneum, but was due to leakage from ruptured loculi in an ovarian tumor. Unlike the bland fluid of parovarian cysts, this mucoid fluid is not absorbed and excreted by the kidneys, but forms a peculiar gelatinous coating on the peritoneal surface of the viscera.

Dermoid Cysts.—Guinard¹⁷_{Nov. 29, '94; Dec. 15} denies that there is any one pathognomonic symptom of dermoid cyst of the ovary. Three signs, on the other hand, when they occur in the same patient, almost assuredly indicate this disease. These signs are pain, slow growth and consequent small bulk of the tumor, and relative youth of the patient. Tillaux and himself have both found that these three signs are reliable. Exploratory puncture is absolutely unjustifiable. Should the tumor be dermoid, puncture is especially dangerous, as the contents of the dermoid cyst are highly irritating to the peritoneum. Guinard admits that there is one source of fallacy in his test for dermoid of the ovary. The pain may be due to torsion of the pedicle of an ordinary ovarian cyst, and, as torsion checks the growth of the tumor and may occur in a young subject, diagnosis in the simplest-looking case must be reserved.

Reverdin¹⁶²_{Feb., '95} observed a case of bilateral, dermoid, ovarian cyst in an unmarried girl 20 years of age. The ovaries were removed and the patient recovered normally. The larger tumor was lined by skin and contained, in the *mélange* of sebaceous matter and hair, a bone representing a superior maxilla and carrying four teeth. One of the cysts in the right ovary contained a yellowish, oily matter and a felted mass of blonde hair. The other cysts were of follicular origin.

A case observed by Lanelongue and Faguet, of Bordeaux,⁸_{Aug. 10, '95} consisted of a dermoid cyst and endothelioma combined,—a rare variety.

Abbe, of New York,⁹⁶_{May, '95} showed to the New York Surgical Society two dermoid tumors removed from one patient. One bore rare relations to the abdominal cavity, being situated high and attached only to the omentum,—not to the ovary nor to the intestine. It measured eight inches in diameter, and contained bunches of hair, teeth, etc. The opposite ovary contained both mucous and dermoid cysts.

S. C. Graves,⁹_{Feb. 21, '95} describes a tumor removed from a young

became constricted off, and grew as narrow, solid strands of epithelium in the connective-tissue stroma, producing a typical carcinoma, which in some places resembled a papillary cancer and in others a cylindroma.

Frederick Holme Wiggin, of New York, ¹_{June 8, '96} presented to the Society of the Alumni of Bellevue Hospital a specimen of phleboliths simulating ovarian carcinoma. The uterus and tubes being in a fibromatous condition, they were removed. This having been done, although the patient was still rigid, it was possible to reach the tumor, which had proved to be composed of phleboliths. Three large ones, each the size of a cherry-stone, had been detached.

Angioma of the Ovary.

Thos. S. Cullen, of Baltimore, ⁷⁰⁴_{Dec., '94} reported to the Johns Hopkins Medical Society a case of angiosarcoma of the ovary which was undoubtedly perithelial in origin, growing from the outer coats of the blood-vessels. As it is sometimes very difficult, and, in fact, impossible to say whether it arises from the outer or inner sheath of the vessels, he thinks the two divisions are sufficient,—viz., those arising from the blood-vessels and those springing from the lymphatics. These tumors have occurred in children 7 years of age and in women 64 years old. The average of eleven cases was 33 years. The chief points in this case were the marked adherence of the tumor to the surrounding structures, the typical vascular fibres enabling him at once to diagnose it as angiosarcoma, and the metastases in the uterus.

Marckwald ²⁰_{B. 186, p. 175} describes a case of angioma cavernosum of the ovary in a woman 22 years old.

Miscellaneous.

In a paper on the rate of growth of ovarian tumors, J. Bland Sutton, of London, ¹⁰⁷⁷_{June 19, '96} mentions a case of simple cyst, which clearly demonstrates that a cyst may arise in a healthy ovary and attain a dangerous size within seventeen months. With regard to a case of ovarian adenoma, he had positive evidence that a complex glandular tumor, containing at least 4 quarts (litres) of colloid stuff, may grow from an ovary of natural size within a space of forty months. In a case of ovarian dermoid the evidence was decisive that a dermoid may arise in the ovary and attain dangerous proportions in an adult woman within the space of three years.

Emory Lanphear ¹¹⁷_{July, '96}, ⁴⁵¹_{Sept., '96} reports a case of insanity cured by removal of a fibroid tumor of the ovary. Boulengier, of Brabant,

removed ¹⁴_{Dec. 23, '94} an ovarian cyst from an insane woman; the mental condition immediately improved. The recovery did not persist.

J. V. Meigs, of Lowell, Mass., ⁹⁹_{Oct. 18, '94} reports a case of ablation of the ovaries and tubes for hystero-epilepsy, occurring at every period and at times between periods, with entire relief from the symptoms since operation. Pamard, of Avignon, ⁸_{Nov. 8, '96} removed the ovaries in a case of hysteria, but no beneficial result was noted.

Pelvic Abscess.

Watkins, of Chicago, ²⁷_{Aug. '96} calls attention to the facts that the first pelvic abscesses that follow labor or abortion are not all diseases of the tube or ovaries, and that intestinal adhesions are not always troublesome and do not always seriously inconvenience the patient. Again, he stated that intra-pelvic pus may, before it is taken out, become practically sterilized, and really may not require enucleation of the sac. Byford, of Chicago, ¹³⁹_{Oct. '96} illustrated the value of these assertions by the histories of several cases.

Treatment.—Vogel ⁸⁴_{Nov. 29, '94}, ²_{Oct. 27} states that in the treatment of solitary pelvic abscess a simple puncture through the vagina suffices when the abscess-cavity is already cut off by pathological processes from the peritoneal cavity, as in extra-peritoneal abscess (parametritis), encapsuled intra-peritoneal abscess (pyocele retro-uterina), or adhesive pyosalpinx. When the abscess-wall, on incision, appears separate from the vagina, so that the cavity may not be safely cut off from the peritoneal cavity, the edges of the sac should be fixed to the vaginal wound by pressure-forceps. These instruments may safely be removed in eighteen or twenty-four hours; the sac by that time will be adherent to the vagina. Hæmorrhage can be checked by pressure-forceps or, if from the interior of the sac, by a gauze tampon.

Watkins, ²⁷_{Aug. '96} before opening the abscess-cavity, dilates, explores, curettes, and irrigates the uterine cavity, finally packing it with gauze. After having let out the pus the abscess-cavity is irrigated with sterilized water and two drainage-tubes inserted. One is large, the other small; they are sutured together and retained *in situ* by a suture into the cervix. He considers the following as indications for this procedure: When the patient is in too dangerous a condition for abdominal section; when the abscess is large, chronic, and situated low in the pelvis; when it is upon the pelvic floor and complicated by rectal fistulæ; when the abscesses are puerperal in origin.

Paul F. Mundé, of New York, ²¹⁴⁰_{'96} in his report of the gynecological clinic of Mount Sinai Hospital, states that pelvic cellu-

litis was noted in 79 cases, with 67 recoveries, 8 cases improved, 4 not benefited, no deaths. With rare exceptions, the cases of pelvic cellulitis followed parturition. The differential diagnosis between the two classes of cases was not easy. His treatment had usually been absolute rest, thorough cleaning out of the bowels to begin with, then regular, but easy, evacuations every two or three days. Cold or hot applications to the abdomen. When the temperature had gone down and only the exudate remained, he applied blisters with hot poultices over the abdomen. Opium only to relieve pain. In 103 cases the pelvic exudate underwent supuration, with 87 recoveries, 6 improved, 1 not improved, 9 deaths. In 95 cases the abscesses were opened by lateral abdominal section, in quite a number through the vagina also—opening where the mass pointed most prominently, but preferring the vagina.

Henrotin, of Chicago, ²⁷_{Apr., '96} recommends a conservative method of treating inflammatory pelvic affections in their incipency by a minor surgical procedure. This consists in making an incision behind the cervix as soon as the diagnosis is established, and penetrating the inflammatory focus with the finger, an iodoform-gauze drain being inserted and left in place. Even after an illness of only six or seven days a pus-cavity is usually found. In twenty-seven cases so treated no bad symptoms followed, and the patients were apparently cured before the establishment of any of the destructive processes that generally lead to chronic invalidism and require laparotomy.

Nogués ⁴⁸_{May, '96}; ²_{July 18} states that Condamin has had excellent results in the treatment of pelvic inflammation by firm plugging of the vagina. Bozemann and Taliaferro first introduced this practice. It supports prolapsed or tender structures and remedies congestion by dialysis, as the plugs are always saturated in glycerin. The plugs, each as big as a walnut, when pressed after soaking, are introduced through a large speculum in the usual manner and packed very firmly. The lower part must not be plugged, otherwise dysuria or retention may occur. The "columnization" of the vagina is not suitable for pyosalpinx and other severe diseases of the appendages. Condamin finds that, on the other hand, it is particularly suitable for posterior parametritis. It relieves the uterine congestion and promotes absorption of the parametric exudation. The patient can walk about and attend to duties after the "columnization" of the vagina. A free fluid discharge comes on about the second day. The plug may remain in place for several days. Of course, the vagina must be rendered antiseptic before its application. The first plugs, which touch the cervix, should be dusted with iodoform.

Cœliotomy.

Indications.—Matthaei³⁹³_{A.M.H.} recommends resection of the ovary when it contains retention-cysts too large or too numerous to be treated by ignipuncture; also in case of small dermoids and, under great precautions, in proliferating glandular cystomata of small size. The ovary should be removed, in his opinion, in all cases if the women are near the menopause or if there is malignant disease or the slightest suspicion of it. In a discussion, Martin,⁴_{Doc. 24, '94} of Berlin, who is a warm partisan of conservative measures of treatment of uterine appendages, expressed himself as not in favor of ignipuncture of the ovarian follicles, preferring to puncture the cysts when they are small, this method requiring no suture and causing little loss of blood. When the cysts are large, resection is necessary, as cauterization is insufficient. Finally, if the degeneration of the follicles has destroyed the entire ovary, the latter must be removed. Dührssen stated that opening of the cysts with the Paquelin cautery prevented loss of blood and did not favor ulterior adhesions of the ovary, while their opening with the bistoury caused hæmorrhage and necessitated suture, which might lead to adhesions later on. He has also found that cauterized ovaries diminish in size. In cases of double chronic ovaritis he practices vaginal cœliotomy, extirpating only the more diseased ovary and treating the other by ignipuncture, thus avoiding castration, while assuring recovery. Veit leaves the ovaries, whenever possible, in young women; he has found ignipuncture and incision of the follicles of no value.

Pinese²¹²_{Apr. 25, '95; May 18, '95}² has traced 136 out of 268 patients who had been operated upon by Lucas-Championnière, both appendages being removed for inflammatory diseases of the tubes and ovaries. The 136 only include after-histories of over one year, the majority being of two years' and a few of five or six years' standing. In only 8 per cent. did abdominal pain persist. It is significant that the pyosalpinx cases gave the best results, the pains felt before operation always ceasing. Persistence of the pain seems to be neurotic. On the other hand, the catamenia persisted in 22 per cent. of the cases, pyosalpinx being the most frequently (50 per cent.) followed by this phenomenon. In the least advanced cases of inflammatory disease subjected to the operation in question the period ceased in almost every instance. Persistence of the menses is undoubtedly due, as might be expected, to the leaving behind of portions of ovarian tissue. This has been proved in second operations where corpora lutea were seen on the stump of the old pedicle. In itself, however, partial or occasional irregular menstruation is rather favorable to the health of young patients.

Pinesse has never seen insanity follow the operation, nor is obesity the rule. All nervous symptoms are to be attributed to the artificial menopause. Vaginismus developed after operation in a few cases, and one patient suffered from contraction of both hands. Both these symptoms seem to be neurotic.

Mundé⁵⁰_{Oct. 19, '98} performed cœliotomy for ovarian tumors and cysts of the broad ligaments 149 times. Of these 128 were ovarian tumors, with 11 deaths. The rest comprised hæmatoma, carcinoma, papilloma, acute œdema of the ovary, and 7 cases of cyst of the broad ligament. Two cases of fibroid of the ovary, both recovered after operation. In 25 cases the ovarian tumor was dermoid,—10 of the right, 10 of the left ovary, 5 of both ovaries. In 1 case the dermoid on one side contained a large switch of black hair about six feet long. In 23 cases torsion of the pedicle of the tumor was found, all recovering but one. The torsion was usually to the right in cysts of the left ovary, to the left in cysts of the right ovary; so that it was usually found on the opposite side from its origin.

J. G. Mumford, of Boston,⁹⁹_{Feb. 14, '98} speaking of the ultimate results of the removal of the ovaries and tubes, stated that, of 17 cases of removal of tubes and ovaries of which history could be given, 8 were cured, and that the balance complained, more or less, of painful symptoms. In his opinion, patients, as a rule, are sent home too early, are allowed out of bed too soon, and are lost sight of too soon after the operation. The general health must be most carefully restored and the condition of the bowels, bladder, kidneys, and stomach regulated. Severe attack of post-operative constipation may become the exciting cause of recurrent pelvic abscess.

E. E. Montgomery, of Philadelphia,⁶¹_{Aug. 31, '98} concludes: 1. That no mutilation should be performed when there is any chance of relieving the inflammatory condition by means of colpotomy and drainage. 2. If partial disease of ovary and tube exist, an attempt should be made to preserve the healthy portions by resection. 3. If the disease of the ovaries and tubes present is so marked that complete removal is considered necessary, less subsequent nervous phenomena occur if hysterectomy be performed in addition. 4. Castration for neuroses should only be resorted to as a last resource.

Complications and Sequelæ.—Ernest W. Cushing, of Boston,⁹⁹_{Feb. 14, '98} has found that, in the vast majority of cases, the ability, under proper circumstances, to have as much sexual feeling as the patients previously had is not impaired. His experience has been that the removal of the uterus has no more evil effects than the

removal of the appendages alone, and that the removal of the appendages alone has, in itself, under very rare circumstances, caused a loss of sexual feeling.

A. Laphorn Smith, of Montreal,⁵⁹ Aug. 25, '96 mentions a case in which the removal of the ovaries was not followed by loss of sexual appetite, but, on the contrary, by a marked increase of it. J. J. Putnam, of Boston,⁹⁹ Feb. 14, '96 states that many patients complain not only about the ovarian pain, but also of general pain. Charcot tried to set aside a special form of hysteria which he called ovarian hysteria. While improvement is occasionally due to the removal of ovaries which are really more diseased than we can tell from the outside, the part played by the more favorable mental condition occurring as the result of the operation should not be overlooked. A careful study of mental therapeutics, the light thrown on it by hypnotism and suggestion, has enlarged our power of dealing with these patients in this way, and we ought, in Putnam's opinion, to use such means before we resort to those of surgery.

Thiercelin and Jayle³¹⁷ 112 No. 34; Nov., '96 report seven deaths occurring in the first few days after coeliotomy in which the post-mortem did not show the least sign of peritonitis, but acute fatty degeneration of the liver. They conclude that the fatty degeneration of the liver was in every case due to septic infection, and that the general infection occurred so suddenly and advanced so rapidly that there was not sufficient time for local lesions or symptoms to develop.

J. F. Cowles, of Los Angeles,⁴⁴ Jan., '96 describes a case of general peritonitis caused by a twisted pedicle of an ovarian dermoid. The condition was relieved by operation, and two weeks later a secondary operation for intestinal obstruction was successfully performed.

Winter³¹⁷ No. 29, '96 states that hernia after ovariectomy and other pelvic operations is frequent, and is due to failure of union of the aponeurotic layer. Hence Winter always unites the edges of this layer separately with a continuous catgut suture, after closing the peritoneal incision in the same manner. The skin and subcutaneous tissue are united with interrupted silk sutures and, lastly, the skin wound is closed accurately by means of a running catgut suture. Collodion is applied along the wound.

Cases in which the ureter is severed during operations on the pelvic organs are not uncommon. Charles B. Penrose, of Philadelphia,¹⁴⁴ Jan., '96 states that such accidents are often, perhaps generally, not recognized at the time of the operation; but some hours or days afterward the surgeon's attention is directed to the possibility of this accident by complete suppression of urine or by marked diminution in quantity.

As the proper treatment of such injuries to the ureter depends upon the early recognition of the lesions, he has kept careful measurements of the amount of urine passed during the first forty-eight and seventy-two hours.

A fatal case of suppurating bilateral parotitis which had come on ten days after the removal of the uterus, tubes, and ovaries is related by James F. W. Ross, of Toronto. ²⁷ _{Nov., '96} In the discussion, Edwin Ricketts, of Cincinnati, reported a similar case in which convalescence, though tedious, ended in recovery.

Everke ⁶⁹ _{May 16, '96; June 2} describes a case in which parotitis set in after a double ovariectomy. The parotid suppurated; marked mental symptoms were present, though the pulse and temperature were not remarkably high. The patient became irascible; she refused food and had to be handcuffed. At the end of a month she was quite well in mind and body. In a second case both ovaries and tubes were removed. The patient was allowed an air-cushion, against which she laid her face. It happened that the cushion had just been used by a woman who had facial erysipelas. Both parotids were attacked and the patient died.

In a case of intestinal obstruction after ovariectomy, Bidwell, of London, ²² _{July 24, '96} re-opened the abdomen in the middle line, finding a loop of the ileum adherent to the scar, and also a loop of the sigmoid. One of the appendices epiploicæ was adherent to the ileum and formed a band under which another loop of ileum was strangulated. A case is also recorded by Battle, of London, ²² _{June 20, '96} who concluded that in this case the obstruction probably depended on a kink in the sigmoid flexure which had doubled forward on itself into the pelvis and became adherent there. Legueu, of Paris, ¹⁴ _{Sept. 15, '96} has met with four cases of intestinal obstruction after ovariectomy, and advocates the use of a purgative the day after operation, in order to prevent such a complication.

Louis Frank, of Louisville, ⁹ _{Jan. 19, '96} describes a case of intestinal fistula following cœliotomy. Operation revealed, as had been suspected, that the fistulous tract was in the track of the drainage, and that at the bottom there was the ligature that had been applied to the broad ligament, and had no doubt become infected through the drainage-tube.

C. J. Cullingworth, of London, ⁶ _{June 1, '96} successfully removed an ovarian cyst weighing over 80 pounds (36 kilogrammes) from a girl under 17 years of age. W. Forbes, of Gippsland, Australia, ²⁸⁵ _{Aug. 20, '96} removed an ovarian tumor from a patient aged 9 years. It was a myxosarcoma weighing 4 pounds (1.8 kilogrammes).

At a meeting of the Obstetrical Society of London Leonard Remfrew ² _{Apr. 12, '96} presented a list of ten ovariectomies in women over

the age of 80, and a case, aged 83, complicated by epithelioma of the vulva. Every patient had recovered. The list included operations in England, America, Australia, and Germany.

E. Matthews Owens, of Brisbane, Australia, ²⁶⁷_{Sept. 15, '94} places on record a successful ovariectomy on a patient, in her 87th year, from whom seven years previously he had removed a large parovarian cyst. J. Bland Sutton, of London, ²²_{Sept. 26, '94} removed a parovarian cyst from a patient aged 74 years. As the cyst was drawn through the incision the vermiform appendix was found adherent to it and was carefully detached. Two vessels in the mesentery required ligation. The patient recovered without any evidences of shock. Leith Napier, of London, ⁴⁹_{Aug. 7, '95} performed ovariectomy for sessile, intra-ligamentous, suppurating, ovarian cyst, in which a part of the cyst-wall was firmly attached to and had penetrated the muscular layer of the uterus at the fundus. Extra-peritoneal treatment of the suppurating fundus uteri was followed by recovery.

Drainage.—Czempin, ¹¹⁹⁰₁₈₉₄ in an elaborate paper, gives the results of nine years' operative work, during which he closely followed the different methods recommended by Sänger, Mikulicz, Martin, Veit, and Olshausen. He calls attention to the fact that Sänger has practically discarded drainage, that Veit now considers that its indications are few, and that, generally, opinions differ so widely that no rule can be established. Finally, he concludes that the results in complicated cœliotomy are only rarely improved by the use of drainage, and that, in the greater number of cases where it is used, it is not essential. If virulent organisms are present, it can scarcely save life; if the virulence is extinct, it is not necessary. Where in the removal of a non-infectious new growth the pelvic connective tissue is separated, drainage is not only unnecessary, but often does harm. Where there is a closed-off, acute inflammatory process in a tumor in the peritoneal cavity and in its removal pus escapes into the peritoneal cavity, infection is to be feared. Particular caution should be taken that the least amount of the peritoneum is infected, and the material should be carefully removed with the sponge. The use of the iodoform-gauze tampon does not, physically or chemically, influence the result. The opening of acute inflammatory connective tissue in adnexa operations is very dangerous. Whether drainage can save the patient's life is questionable. In such cases he believes complete hysterectomy gives the best results. In adnexa operations he advises that the operation be performed six months after the last exacerbation. In cases in which the pelvic connective tissue is widely separated in the removal of a tumor (hæmatoma of the ligament) drainage is not necessary. In very difficult operations,

where the pelvic connective tissue is widely separated and the case is septic, the best results are gained by complete hysterectomy and drainage with iodoform gauze through the vagina.

Boisleux, ³¹⁷_{Dec. 15, '94}, ⁸⁰_{June 15, '95} while recognizing that the use of antiseptics has fulfilled the prophecy of gynecologists that drainage would no longer be necessary in simple operations without complications, sterile cysts, extra-uterine pregnancies, etc., considers that it is necessary in cases of purulent ovaritis, salpingitis, or pelvic abscess in any situation,—i.e., wherever there are germs. At the last Gynecological Congress at Breslau most of the operators opposed drainage, while Frommel, Schauta, Säger, and a few others favored it.

Schauta decides during the operation whether he will drain or not, depending upon the discovery by the microscope of pus in the adnexa. If bacteria are present, he then uses drainage. If bacteria are not present, he closes the wound without using the tubes. The objection to this is the difficulty of deciding the presence or absence of pus-microbes. It is not always possible to determine the presence of bacteria, while cultures cannot furnish a timely information. Consequently each case must be treated as though sepsis were present. As to the length of time during which drainage should be pursued, the results of Morax and Hartmann show that, in salpingitis containing sterile pus or containing gonococci, the tubes or drainage should be taken out thirty-six to forty-eight hours after the operation. In salpingitis containing streptococci or any other form of pyogenic microbe the drain must be left much longer.

To prevent stopping of the tubes by blood-clots or other means Boisleux advises that a piece of iodoform gauze be drawn through the tube and removed at the first dressing, insuring continuous drainage. Ordinary capillary drainage, as suggested by Mikulicz, is dangerous. The author, after trying it in fifteen cases, obtained only one good result. The double drain, proposed by Péan, fixed by suturing to the uterus, is considered very efficient, but it often occupies too much space.

Moulouguet, ²³⁰_{Dec., '94} states that vaginal drainage is favored by the law of gravitation, and that it should be practiced through Douglas's pouch in pelvic suppuration, extensive adhesions, and partial hysterectomy, and as an index when hæmorrhage is feared.

A case of fatal intestinal paralysis and obstruction after laparotomy, recorded by Engström, ¹⁶⁴_{Oct. 2, '95}, ¹²¹_{Nov.} is of particular value, inasmuch as it seems to settle the question of the causes of the death in which this paralysis almost always terminates, and which has been attributed by some writers to an intestinal intoxication result-

ing from the paralysis and by others to an hyperacute septicæmia. In the course of the operation the sanguinolent fluid within the peritoneum was sponged, by which procedure the intestinal loops and the peritoneum were several times submitted to a mechanical irritation. On the evening following the operation the patient was suddenly attacked by vomiting. On the succeeding day this symptom continued, the abdomen was swollen, and the pulse became small and feeble. The situation was aggravated on the following days by the appearance of signs of intestinal obstruction, and on the fifth day after the operation the patient succumbed, half an hour after a second laparotomy, which showed the absence of any obstacle to the passage of fæcal matters. The bacteriological examination of the peritoneum and its contents, made with rigorous precautions an hour after death, gave results entirely negative. A complete autopsy, made five hours later, demonstrated the absence within the peritoneum of any septic infection.

[The inference to be drawn from this case is that mechanical irritation induced by anything but gentle manipulation of the intestine during operation tends to induce paresis and, possibly, as in the above case, paralysis.]

Tait²⁷ states that in seventy or eighty of his cases hæmātoma occurred in the broad ligament some hours or days after operation. Penrose believes that this accident is due to the retraction or slipping of the artery from the embrace of the ligature, while the remaining mass of tissue which forms the pedicle is still retained, and the hæmorrhage is, therefore, confined to the broad ligament. He has seen this accident happen before the abdomen has been closed, and has sought for and ligated separately the retracted vessels. Slipping of the ligature, he says, is due to the form of the mass of ligatures which is ligated. The broad ligament is drawn up into a more or less conical shape, all parts converging toward the ligature, and the ligature is really placed at the apex of a cone, from which it may readily slip. The elastic artery, tied when upon the stretch, tends to retract and escape from the embrace of the ligature.

EXTERNAL GENITAL ORGANS.

General Considerations.

Thomas Wilson, of London,³² reviews exhaustively the bacteriology of the female genito-urinary tract. It is generally agreed that, in the vast majority of cases, micro-organisms are introduced from without; that the patient is inoculated inadvertently, through ignorance or in spite of every precaution; but

undoubtedly inoculated. Dirt on the hands, the nurse, the patient, the bed-clothes, on the instruments or utensils may each or all give rise to infection of greater or less severity. Can the patient, apart from a dirty skin and vulva, infect herself? Or are her attendants always to be blamed? Numerous series of observations have been made to settle this point, and the sum of them tends to show that, if auto-inoculation does take place, it is, at any rate, extremely rare compared with infection from the outside. The author quotes the observations of Krönig, Menge, Walthard, Winter, Stroganoff, and others to show that the vagina always contains microbes, usually of many different varieties and forms; the body of the uterus and the tubes contain none; the cervix, certainly in its upper half or more, contains none normally.

The limit between the bacterium-containing and the bacterium-free portions is at or a little above the external os. Thus, Walthard⁹⁵_{B. 46, H. 2, '06} places it at the middle of the cervix, whether the cervical secretion is normal or not. Menge³¹⁷_{p. 314, '06} places it at the point where the whitish mucous column in the cervix passes over to the clear one, the former being acid in reaction, the latter alkaline. Stroganoff³¹⁷_{p. 1000, '06} holds that the external os is the limit.

From fourteen to twenty varieties of micro-organisms have been found inhabiting the vagina. Streptococci resembling the pyogenes are common and are regarded by Winter and others as really an attenuated form of this microbe,—one requiring favorable conditions, such as are sometimes present after delivery, in order to exercise their usual pathogenic effect. Krönig has obtained, among others, cocci in series of twelve to twenty, which could not be distinguished from the streptococci of puerperal fever. These vaginal streptococci could not be grown in contact with air; they differed in many points from the streptococci found by Walthard; they were found still in the vagina on the third day after labor, and did not appear to pass over into the cavity of the uterus; injection of them subcutaneously and intra-peritoneally into dogs gave rise to no reaction. This observation seems to cast doubt on the attenuated-virus theory. The subject requires further investigation. The germs which are present in the vagina slip in from the ostium vaginæ; the different kinds may be found, according to Krönig, in pure culture, or from two to six varieties—never more—may be found growing together. This is in opposition to the previous observations of Steffek, Döderlein, and Winter, who believe that all the varieties may be found luxuriating together.

The effect of the vaginal secretions on different kinds of germs

has been investigated by Krönig⁶⁹ Nov., '94 in pregnant women and by Menge⁶⁹ Nov., '94 in non-pregnant. In both classes of cases the secretions were found to have a marked power of destroying the vitality of the pyogenic organisms. When these germs were introduced into the vagina and the secretions afterward examined at intervals, it was found that after a longer or shorter time the organisms disappeared, both from the fundus and the entrance of the canal. Krönig further shows that syringing the vagina with antiseptic solution reduces or destroys this germicidal power. On this account he recommends that disinfection of the internal genitals should be given up as a part of the routine of antiseptic midwifery.

Vulvitis.

Morgenstern⁵⁹ Feb. 1, '96 describes an interesting case of acute gonorrhœal vulvo-vaginitis and urethritis in an infant at birth. The child was first seen at the age of 3 weeks, when it was stated that urine had been voided scantily since birth, the little that was passed coming away a drop at a time. On local examination nothing could be seen except possibly a slight reddening of the parts. A probe introduced into the urethra encountered no obstruction, and the bladder was found not to be distended. One week later the mucous membranes of the labia majora, nymphæ, vestibule, and anterior portion of the hymen were reddened and engorged and exquisitely tender, and a thick, creamy, muco-purulent discharge was observed. More urine than formerly was voided, but the quantity was still very small. The mother admitted that she had been treated for a long time for a vaginal discharge similar to that from which the child was suffering. As the child slept with the mother, the chances of direct infection were thus most favorable. Gonococci in great numbers were found in the discharge. Under ordinary appropriate treatment a cure was effected in a short time.

In two cases of simple muco-catarrhal vulvitis in girls of about 10 years of age, observed by Coyne and Auché¹⁸⁸ June 30, '96; ⁶⁷³ Sept. bacteriological examination revealed the absence of gonococci and the presence of several varieties of microbes,—the coli bacillus, staphylococcus albus, and the streptococcus pyogenes. The first was found in only one of the cases, in which the linen of the child was soiled by fecal matter. The staphylococci were rare in this case, but frequent in the other one. Streptococci were numerous in both cases; upon one examination they were but slightly virulent, and upon another they were sufficiently so to determine an erysipelatous redness of the entire ear of a rabbit, while intra-venous injection caused death in six days. The authors are inclined to attribute the vulvitis to these micro-organisms, though they do not affirm this as

a fact, since, in cases in which cleanliness is not observed, numerous microbes may be present in the parts. Weill and Barjon, of Lyons, describe ¹³_{Nov. 2, '94} an epidemic of vulvitis in children due to the use of a rectal thermometer. The rectal temperature was taken morning and evening in all the patients.

Hartmann ⁴⁸_{Jan. '95} states that the discharge from the vulva may undoubtedly set up gonorrhœa in the anus or rectum in careless subjects. Direct transference may occur in obvious ways: thus, a constipated patient, accustomed to pass the finger into the rectum to facilitate defecation, conveyed the gonorrhœal poison to the lower bowel.

Kraurosis Vulvæ.

C. A. L. Reed ¹_{Sept. 20, '94} expresses the opinion that progressive cutaneous atrophy of the vulva (kraurosis vulvæ) is a distinct disease. It is of very rare occurrence and essentially inflammatory in character, differing from other inflammations of the skin in the marked progressive atrophy which succeeds the stage of hyperæmia and infiltration. It is limited in its manifestations to the vulva. Its etiology is so obscure as to suggest a primary causal lesion in the trophic nerve-supply of the vulva; it is manifestly not syphilitic. Affected areas may be successfully excised. Reed reports six cases in which the pathological and clinical features were characteristic. The first changes obvious to the naked eye consist of small, vascular areas around the introitus vaginæ; these are not elevated, as if seats of merely inflammatory engorgement, but are slightly depressed relative to the adjacent epithelial surfaces. They are exquisitely painful to the touch, and efforts at sexual intercourse are generally agonizing and futile. About this same time inspection will reveal a narrowing of the vaginal orifice associated with diminished elasticity of the structures. The cutaneous or muco-cutaneous surfaces will now be observed to have lost a certain proportion of their pigment, giving them a more or less translucent appearance, which increases until it becomes so transparent that the large capillaries and minute ecchymoses may be readily discerned beneath it. The skin thus affected becomes tense, effacing, in a more or less degree, all of the normal folds of the vulva and narrowing the vaginal orifice until, in the case of a multipara, incredulity may be excused when the patient states that she has borne children. The condition may, in the last instance, become of medico-legal importance.

Arthur W. Johnstone, of Cincinnati, ¹¹⁹²_{Jan. '95} believes that the majority of cases classified as granular vaginitis, kraurosis vulvæ, and vascular degeneration of the vulva are nothing more than

varying forms and conditions of trachoma. While at Birmingham during six months he observed at least half a dozen such cases, and was able in "one or two cases" to watch their progress while in England. His former experience as an oculist enables him to compare this disease with trachoma of the eye; he considers the two practically identical.

Cancer of the Vulva.

J. W. Taylor³²_{Dec., '94} cites a case which he considers as answering affirmatively the question whether epithelioma of the vulva can begin as a chronic and intractable "inflammation." The patient when first seen was found to be suffering from urethritis with a hard, red rim round the urinary meatus. There was no history of syphilis or gonorrhœa in either the patient or her husband. For two months the urethritis remained intractable. At the end of this time there were indications of a progressive erosion of the cervix, and the opinion was formed that both conditions were really epitheliomatous. The cervix was amputated, and for a few months the disease appeared to be in abeyance, but it returned in the pelvis, and eventually the vestibule and anterior vaginal wall were found to be the seat of a dark-red, slightly-raised, papular growth. Taylor concludes: "Whether this urethritis be regarded as only a complication or premonitory symptom (like the nipple-eczema sometimes premonitory of cancer of the breast), the clinical fact remains that it never was cured and finally merged by imperceptible stages into the general condition of malignancy."

B. C. Hirst, of Philadelphia,²⁷_{June, '96} states that the general impression among gynæcologists is that epithelioma of the vulva is an incurable disease. In a case which he alluded to, for instance, Goodell had refused to operate, although the condition was most favorable for operation, and there had been no recurrence a year after operation. D. Berry Hart,¹⁵_{Feb., '96} makes the positive statement that epithelioma vulvæ is sure to return, and yet, a few paragraphs farther on, refers to Ruprecht's case of very extensive disease removed by an operation that included the removal of the inguinal glands, without recurrence after more than three years. Again, in a recent discussion before one of the American gynæcological societies the hopelessness of the operative treatment of epithelioma of the vulva was generally admitted. He calls attention to the fact that there is a rare form of syphiloderm of the vulva so closely resembling epithelioma as to be differentiated from it only by the therapeutic test or by the microscope. He presents the illustrations of a case of extensive and inoperable epithelioma under the care of Stelwagon, and which was thought by a number of specialists

who examined it to be epithelioma. In this case ten days of antisyphilitic treatment effected such improvement in the condition of the growth that all doubt as to its nature was dissipated.

Anomalies of the Hymen.

C. E. Purslow, of Birmingham, ⁶_{Mar. 1, '96} mentions a case in which the hymen presented two separate, small, rounded apertures, each just admitting the uterine sound. The finger was passed forcibly, and two small polypi were found to be protruding through the cervix; these were removed. The point of interest about the case is that the hymen approached to that variety described in the text-books as cribriform, and, although almost all the text-books agree in stating that such a form of hymen may be found, recent investigators have denied that any such condition of hymen ever does exist.

A case of double hymen is recorded by Olenine ⁵⁸⁶_{No. 23, '96} in a young peasant woman, 20 years old, in good health, having menstruated for the first time at 15, and recently married, who came to the hospital with her husband because the first attempts at sexual intercourse had been unsuccessful and painful. An examination being made, Olenine found a thick and fleshy hymen, with an opening toward the top large enough to admit only the little finger. By digital examination through the opening he came into contact with a second, thinner membrane closing the vagina at its posterior third. A crucial incision through both obstacles permitted complete sexual intercourse. Cases of authentic double hymen are, as is well known, very uncommon. It is interesting to call attention to this case.

Treatment.—Alexandroff ¹⁰²_{Aug. 25, '96} states that in the greater number of cases of imperforate hymen, in which there is accumulation of fluids, the best operation is that of Zeist, but that one must be prepared to do laparotomy, which may be urgent on account of rupture of the Fallopian tubes. If a diagnosis of distension of the tubes by the blood is made, laparotomy should be performed. Washing out after the operation is not always necessary. The prognosis is not bad when antiseptis or asepsis is well carried out.

Anomalies of the Vagina.

H. N. Vincberg, of New York, ⁵⁰_{Nov. 17, '96} states that the meagreness of the literature on the subject of congenital stenosis may be judged from the circumstance that, in 1890, L. Kleinwächter was able to collect only twenty published cases, and in only two of these was the annular stricture situated at the junction of the middle with the upper third of the vagina. The author reports

two cases. The diagnosis offers but very little difficulty. The examining finger comes against a ring-like constriction in the upper part of the vagina, with an opening varying in size from a few millimetres in diameter to that which will admit the point of one or two fingers. An examination per rectum will reveal the cervix lying two or three centimetres above the constriction. An apparent stenosis is not infrequently observed in pregnant women. It is situated in the upper part of the vagina, not far below the vault, and, though the constriction may be considerable, it never offers an obstruction to labor.

The treatment usually adopted consists in forcibly rupturing the membranous ring or making a crucial incision and stitching the torn or incised membrane together in the direction of the long axis of the vagina. In cases in which the thickness of the constricting ring is within moderate limits its excision, with subsequent stitching of the upper and lower edges of the mucous membrane, forms, in his opinion, the ideal method. The loss of blood may be reduced to a minimum by beginning with the continuous suture as soon as a small portion of the ring is excised and following up the cutting with suturing.

Muret, of Lausanne, ⁸ ⁶⁷³ had occasion to observe and afterward to operate upon an interesting case of lateral hæmatocolpos in a young woman, aged 18, who had had irregular menstruation for several months and suffered from dysmenorrhœa of increasing intensity. An elastic tumor appeared above the symphysis pubis and formed a marked prominence in the vagina. An incision in the lower part of the tumor gave issue to about two litres (quarts) of chocolate-brown colored blood, very ropy and viscous. After the operation the pains disappeared and menstruation returned regularly. A further examination of the patient under ether showed that the vagina was double; the right, which was the seat of the atresia, was the least developed, its cavity being divided in two by a diaphragm with a large excentric orifice; the vaginal portion of the uterus was slight; the uterus itself was small, but well-formed, and on its left an ovary could be felt. The left vagina, which was open, was narrowed considerably toward the top, and ended in an orifice which communicated with the right vagina. This co-existence of a single uterus, *non-unicorne*, with two vaginæ is very rare, and is explained by a fusion of Müller's ducts, complete on top, but incomplete below. It is also curious to note that the vagina showing atresia was best developed, while the other, which was rudimentary, was permeable. The presence of menstruation prior to the operation is explained by the communication between the two vaginæ. Hence, from a practical point

of view, the evident importance of a careful examination in all cases of dysmenorrhœa, in order that similar conditions may not escape observation.

Max Simon³¹⁷_{May 25, '91} No. 51, '94; ²_{Jan. 20, '95} describes a remarkable case of absence of the vagina with fair development of the ovaries. The patient was 29 years of age, and had been married six months. Her husband seems not to have been aware that the vulva was closed, but the meatus urinarius was made to supply the place of the vagina.

Heaton²_{May 25, '95} records a case of extreme dilatation of the vagina in an infant, 6 weeks old, who had died with a large pelvic and abdominal cystic tumor. The cyst, which was the size of a large melon, had the bladder attached to the front surface of it, the rectum behind, and communicated above with a small, but dilated, uterus. The uterine appendages, kidneys, and ureters were normal. The cyst caused death by retention of urine.

J. C. Da Costa, of Philadelphia,⁹_{Sept. 9, '94} reports a case of absence of the vagina with hæmatometra from retained menses. Cases of vaginal septa are recorded by L. Gillion, of Brussels²⁵⁶_{Sept. 20, '95}; Mertens,³¹⁷_{Oct. 12, '94} and S. W. Torrey, of Beverly, Mass.⁹⁹_{May 30, '95}

Atresia of the Vagina.

E. Winternitz³¹⁷_{No. 24, '95} describes a case in which, through the presence for six years of a bobbin in the vagina, a very marked degree of cicatricial stenosis was developed. Similar cases are few in number, but references are given to five,—those reported by Breisky, Pearse, Kottmann, Carter, and Broer. Winternitz³¹⁷_{No. 13, '95}; ²_{Apr. 27} records a case of hæmatocolpos, after adhesive inflammation of the vagina, in a woman aged 62. A fluctuating tumor occupied the pelvis and reached a hand's breadth above the symphysis, which resembled a uterus at the fourth month of pregnancy and did not move freely. Sanious watery fluid ran from the vagina. The mucosa showed numerous petechiæ and ecchymoses and was smooth; no cervix could be felt, the fluctuating cyst pressing down posteriorly. The vagina ended in a funnel-shaped point to the left, and was surrounded by cicatricial bands. On rectal examination the uterus could be felt behind the fluctuating swelling. An exploratory puncture was made into the swelling from the vagina. Chocolate-colored blood came away. An incision was made extending to the right and left of the puncture, and a pint and a half of old blood escaped. Then it was found that the cavity whence the blood came was the upper part of the vagina; the cervix opened into it. Around the incision was a dense ring of cicatricial tissue, produced by old inflammation (senile colpitis).

Heydenreich, of Nancy, ^{Aug. 21, '96} states that acquired atresia of the vagina is usually consequent on traumatic or ulcerous lesions; accordingly it is often complicated by extensive cicatricial tissue, more or less surrounding the neighboring organs and creating difficulties in the surgical treatment of the condition. Some operators have inadvertently opened the bladder or rectum while trying to find the upper extremity of the vagina. In such cases he considers it best to attack the post-atresial collection of menstrual blood by a retrovaginal operation. He first opens the posterior vaginal wall below the seat of the atresia, and separates the rectum from the vagina until he comes upon the collection of blood. This part of the operation may be assisted by the introduction into the rectum of an assistant's finger. By this method of procedure the collection is opened with perfect asepsis. Later on the passage of sounds through the opening prevents any narrowing and consequent closing. The author considers that the retrovaginal operation gives a sure and methodical way of coming upon such collections. In many cases of acquired atresia of the vagina it may be looked upon as the best operation.

Cancer of the Vagina.

Primary cancer of the vagina is stated by most authors to be relatively rare; however, the great scarcity of cases, according to R. Labusquière, of Paris, ⁴⁸ ^{Sept. 1, '96} may to a certain extent depend upon the slow evolution of the affection, many women only seeking help when the process has extended to the uterus and sometimes to the parametrium. Under these conditions it is much more difficult to determine the exact site of the primary disease, or is perhaps deemed useless, since the case is regarded *a priori* as operable. Martin observed the condition but once among 5000 women, and Olshausen in a recent article ³¹⁷ ^{Feb. 1, '96} states that but 18 cases were observed at the Frauenklinik of Berlin between 1886 and 1894. In 13 of these cases the neoplasm had developed on the posterior wall of the vagina,—the usual location, according to most writers. All are in accord as to the gravity of the affection and its tendency to recur after the usual surgical intervention, no matter how thoroughly this might be done. It seems impossible to prevent the inoculation of healthy tissues, and it is with this end in view that Olshausen has recommended operating in such cases by the perineal method. He records three cases in which he made use of an adaptation of the perineotomy invented by Zuckerkandl for extirpation of the uterus. He first divided the perineal body transversely, and then separated the posterior vaginal wall from the rectum by means of the blunt director and finger.

He did not open the peritoneal cavity if the uterus was to remain in position. He then made lateral incisions and removed the diseased mass with scissors, carefully suturing the cut edges together and to the rectal wall. In the discussion of a paper presented by Olshausen to the Berlin Medical Society Gottschalk recalled the fact that Fenger, of Chicago, had in 1893 published a case successfully operated on by the perineal method. The advantages of the method, according to Olshausen, are that separation of the diseased portion of the vagina, the opening of Douglas's *cul-de-sac* when necessary, and the partial liberation of the uterus from its ligaments are effected without contact with the neoplasm; while, in addition, the operator has much more space to work in, and is able to more easily and surely circumscribe and excise the degenerated portions of the vagina.

Dührssen³¹⁷_{nos. 1, 2, 3, 4} prefers to this method a procedure derived from his own method of wide vaginal incisions, of which he has made various applications in gynecology and obstetrics. The principal feature consists in a deep vagino-perineal incision from the vaginal *cul-de-sac* to the fourchette, and from there backward in a line going from the anus to the ischium. He performed this operation in a case in which the right half of the posterior wall of the vagina was involved; and he remarks that, as more radical measures could not here be used, his method was justified by the hæmorrhage and intolerable pain from which the patient was thus relieved. When total extirpation of the uterus is necessary high amputation of the cervix had better be performed before the diseased area is excised; but, contrary to Olshausen, Dührssen does not believe that total hysterectomy is always necessary when the uterus is involved, the parametrium being affected not by extension of the lesion from the vaginal portion of the cervix, but by direct propagation of the vaginal disease.

W. Thorn³¹⁷_{nos. 1, 2, 3, 4} states that he used the perineal method in two cases, in 1891 and 1892, using a technique very similar to that described by Olshausen. One of his patients survived two years, the other one year. H. Thomson, of Odessa,³¹⁷_{nos. 1, 2, 3, 4} reports that after the communication of Olshausen, but before those of Dührssen and Thorn, he had occasion to perform a similar operation to that of Dührssen, but as the neoplasm involved the two lateral walls he made an incision first in the median line. The results were good and the patient appeared to be in good health some weeks later; however, the case is too recent to permit of a definite judgment as to the ultimate result. Thomson concludes that, in cases of extension to the vaginal portio, high amputation of the cervix according to Dührssen's method is generally sufficient; that

in a general way the latter's operation is preferable to Olshausen's and involves less mutilation, and that, while the perineal method is especially indicated in carcinoma situated low down, the sacral method of Fritsch and Thorn is more suitable for cases of extensive vaginal degeneration.

Hydatid Cyst of the Vagina.

A. Dermigny²⁰⁰⁰ states that hydatid cysts of Douglas's *cul-de-sac* are not as rare as is generally supposed; in fact, it is in this region that most parasitic tumors of the lesser pelvis are localized. Echinococci nearly always occupy the cellular tissue below the *cul-de-sac* of Douglas, between the rectum on one side and the cervix and posterior vaginal *cul-de-sac* on the other. In growing they rarely invade the perineum or vagina, but tend to develop in two different directions,—(1) separating the broad ligaments to gain the lateral portions of the pelvic cavity, and (2) insinuating themselves between the rectum and uterus, pushing back the peritoneum and obliterating Douglas's *cul-de-sac*.

Fistulae.

Recto-Vaginal Fistula.—Heydenreich, of Nancy,³ operated from necessity by the sacral method in a case of recto-vaginal fistula in a woman 36 years of age. A purulent collection in Douglas's *cul-de-sac* had been incised through the vagina and had afterward opened spontaneously into the rectum. All the faeces passed through the vagina, in which the orifice of the fistula was situated in the posterior *cul-de-sac*, slightly to the right. Heydenreich practiced the incision recommended by Kraske, and, having removed the coccyx and the lower part of the sacrum, he separated the rectum from the vagina with some difficulty. Not finding the vaginal opening and the patient being too weak to stand a long operation, he sutured the rectal opening, partially closing the external wound, leaving it open in front of the fistula and packing it carefully with iodoform gauze. Eight days after operation the administration of a purgative was followed by an abundant escape of faeces through the wound; the flow gradually diminished, however, and two and a half months after operation had entirely ceased. From the time of intervention no more faecal matter was passed by the vagina, but there was a flow of pus from the old fistular opening. Heydenreich intended to perform another operation, but the patient left the hospital. He regards the treatment as especially indicated in cases complicated by an intermediary suppurating pouch between the vaginal and rectal openings.

A. Laphorn Smith ¹¹⁵⁰_{Jan. '96} calls attention to the great importance of always inserting a tube into the rectum to prevent the latter being distended with wind, and to forbid the use of milk, in any shape or form, for ten days.

Ségon ¹⁴_{Mar. 10, '96} relates a case of recto-vaginal fistula due to a foreign body—an ointment-pot—inserted into the vagina fourteen years before.

Vesico-Vaginal Fistula.—Schauta ¹¹⁹⁰_{Jan. '96} claims to be the first operator who has successfully treated vesico-vaginal fistula in which one edge is cicatrized and closely fixed to the pubes. He reports two cases, and says success depends upon thorough separation of the edge of the fistula and the neighboring part of the vagina from the bone. The first step in the operation is to make a vertical cut through the labium majus (on the left side if the fistula be left-sided, and on the right if right-sided) down to the descending ramus. The vagina and fistula are then separated from the inner surface of the bone, care being taken to protect the bladder from injury by means of a spatula and the fingers. The wound is then packed with gauze and the patient is placed in the genu-pectoral position on Bozeman's table. The edges of the fistula, which are now quite movable, are rawed and closed with sutures. Then the outer wound is closed.

Pousson, of Bordeaux, ⁶⁷³_{Jan. '96} in a paper on preliminary cystotomy in certain vesico-vaginal and vesico-intestinal fistulæ, said that the American method had given too good results to permit of any other procedure being substituted for it. There are cases, however, which cannot be operated on through the vagina, such as juxtacervical fistulæ or where there is atresia of the vagina; and in these instances an effort has been made to create a direct passage through the bladder by suprapubic cystotomy. Of seven cases previously published, the author now added a personal case. Of the 8 cases 2 were entire failures and 2 partial and 4 complete successes. The results were, therefore, quite encouraging. His own case was that of a little girl of 6 years, with a fistula, following a vesical calculus, opening into the vagina. The vaginal method had failed, but complete cure was obtained by means of suprapubic cystotomy. The method, in the opinion of the speaker, merited considerable attention, as it was not only applicable to certain vesico-vaginal, but also to vesico-intestinal, fistulæ, the danger being much less than with laparotomy. In the discussion, Albarran, of Paris, recalled, in this connection, the advantages of suprapubic cystotomy in urethral as well as ureteral intervention. Poncet, of Lyons, believed that many supposed incurable cases of vesico-vaginal fistulæ were amenable to treatment by the

suprapubic operation, but that there were many other cases which could only be treated by permanent suprapubic cystotomy combined with occlusion of the vulva. He had recently operated upon such a case, the woman leaving the hospital in a very good condition, with an hypogastric opening which permitted the carrying of a vessel for the urine.

E. Winternitz ⁸¹⁷_{Apr. 12, '90} publishes three cases of vesico-vaginal fistulæ cured by separating the vesico-vaginal septum and suturing each cavity alone, with catgut sutures, under chloroform, the patient being in the dorso-lumbar position. J. C. Bond, of Leicester, Eng., advocates ⁹⁶_{Oct., '94} the treatment of vesico-vaginal fistula by operation from within the bladder through a suprapubic opening, as proposed by McGill, of Leeds. ⁶_{Nov., '90} The latter made a transverse incision through the skin and recti and also into the bladder; but Bond has found that the vertical incision gives plenty of room, the recti being partially divided transversely, if necessary, and then drawn outward.

Emmet ²⁷_{May, '90}; ³⁸_{July} reports a case of aggravated vesico-vaginal fistula in which the destruction of parts was so great that it was deemed impossible to construct a new urethra in the usual way. The following operation was therefore performed: A semicircular incision was made above the pubes, and, converging down toward the centre, the recti muscles were reached just at their attachment to the pubes. With the flap turned back, the index finger of one hand was passed from the vagina into the bladder, and was pressed upward at the proposed point of entrance; then with the blunt end of the scalpel the recti muscles were separated for an inch or more, upon the tip of the finger felt in the bladder. The peritoneum covering the bladder was pressed aside and disappeared. Two sutures were then passed through the presenting part of the bladder on the tip of the finger, and the vesical wall was divided with scissors between these sutures until the first joint of the finger protruded. The edges of the divided skin and of the opening into the bladder were then sutured, a funnel-shaped opening showing the everted vesical mucosa thus being formed. Some time afterward the vesico-vaginal fistula was closed, and the urine began to pass through the artificial suprapubic canal. Later it was found necessary to enlarge the opening. Full retentive power was not gained, but with the help of an instrument on the principle of a truss, through the centre of which the overflow of the urine passed into a receptacle, the patient was kept dry. Emmet points out that the operation will not be frequently needed for the relief of women, but that it may prove of incalculable benefit for men suffering from excessive enlargement of the prostate. A similar case is recorded by Hirst, of Philadelphia. ²⁷_{June, '96}

able to perform the extra work necessitated by a general diet. The importance of carefully watching the urine in these cases is thoroughly demonstrated by a case in which Augustus C. Bernays, of St. Louis, ²⁷_{Mar., '96} had operated for suppurating myoma. The right ureter was stretched out over the tumor, scarcely visible, lying between the tumor and the peritoneum, and was torn off about six inches from its renal origin. The author established a uretero-abdominal fistula, through which all the urine from the right kidney was discharged. The bladder had resumed its normal functions, so far as the urine from the left kidney was concerned. The patient had been in the hospital fifty-two days altogether. Two months later the patient again entered the hospital for the purpose of having nephrectomy performed. Bernays made but one single quantitative test of the urine from the abdominal fistula, and found less than one-tenth of one per cent. of albumin. There were a few small hyaline casts, and the diagnosis of chronic interstitial nephritis of both kidneys was considered as fully established; and the operation, determined upon the incision made, ran parallel to and one inch below the twelfth rib. The peritoneal cavity was not opened. After the kidney was stripped of its capsule down to the hilus he lifted it out of the incision and ligated the pedicle in two parts. The organ was plainly diseased; it presented the characteristic changes of chronic interstitial nephritis (granular kidney), verified by histological examination. The patient made an uninterrupted, afebrile recovery. She left for her home, entirely well, three weeks later, and for the first time in many months dispensed with the services of a nurse. This case is one of great surgical interest; but Bernays notes the fact that the removal of one kidney in Bright's disease may have been shown by it to be a perfectly safe and permissible operation where there is not more than one-tenth of one per cent. of albumin in the urine is as valuable an addition to our knowledge as can be deduced from this experience.

Urethro-Vulvar Fistula.—Verchère ⁹⁹⁶_{Feb. 25, '96} describes a curious case of urethro-vulvar fistula due to proliferating urethritis. The patient, instead of a single normal urethral orifice, was possessed of two, which were separated by a mucous band, below which was to be seen an irregular, red, polypous excrescence. A drop of pus was visible on pressure. The lower side of the urethra had been ulcerated and perforated by these proliferations in such a way that a second orifice had been formed below the normal meatus, both being distended by the polypoid vegetations of the proliferative urethritis. Section of the mucous band and of the vegetations brought about recovery.

Lacerated Perineum.

A. Laphorn Smith, of Montreal, ¹¹⁵⁰_{Jan., '96} states that the obstetrical fault of olden times was to leave the patient undelivered too long. The obstetrical fault of the present day is to terminate the confinement altogether too soon. In a natural labor the child's head comes down and goes back, comes down a little farther and goes back again, and so on many times before the perineum is stretched enough to allow the head to pass without rupturing the perineum; but in these days the forceps are used, it is to be feared, too often to save the doctor's time, but at the expense of great inconvenience and suffering to the woman afterward. He relates the case of a primipara in which forceps were used thirty-six times unnecessarily within a few hours, causing frightful laceration of the perineum before delivery occurred. In some notes on the repair of rupture of the perineum through the sphincter ani, W. L. Burrage, of Boston, ⁸⁹_{Aug. 1, '96} states that the operation which has proved uniformly successful in his hands, both in restoring the sphincter ani and in bringing back the normal contour of the perineum, is Emmet's operation, with personal modifications. The chances of success are much increased by following the rule of all rectal operations,—namely, to first stretch the sphincter, which has been in a state of rest since it was torn, and is contracted in addition. The moment the torn ends are stitched together and the patient is out of ether the irritation from the accumulation of gas, or the pain from the operative bruising of the parts, causes reflex contractions of the muscle that can but interfere with a successful result. The thoroughly stretched muscle remains paralyzed for about forty-eight hours. Burrage notes that Emmet himself does not consider it necessary to stretch the sphincter.

The points that seem to Burrage to be of especial importance are the preliminary stretching of the sphincter; thorough attention to the bowels, both before and after the operation, and in operating in the simplest manner possible,—that is, by using only one set of interrupted sutures passed straight across.

Joseph Price, of Philadelphia, ¹_{Oct. 4, '96} argues that, in order to mend a perineum intelligently, the mechanism of labor must be understood. In cases of serious pelvic invasion, with accompanying lacerated cervix, it is often better, or imperative, first to do the pelvic operation and to follow this at another time with the cervical repair. He condemns the plan advised by some of performing internal and external operations at one sitting. Perineal tears always occur at certain parts of the perineal structure. These tears are either lateral, under the ramus of the pubes, or central, extending from vagina toward the rectum. The tears toward the

rectum tend to run around it rather than through it, owing to the differentiation of structure in these two pubes. The tears of the vagina are always from within outward, from above downward, and therefore the external or skin operations for perineal lacerations are essentially unscientific procedures. All operations for restoring the integrity of these parts should be done in the lines of their destruction, and therefore from within outward and from above downward. When the skin of the perineum is involved, mending of this is merely a cosmetic procedure. The cosmetic element too often predominates in many of the so-called perineal devices. The silk-worm gut with shot is by far the best material to be used for sutures. As little tissue as possible is to be included within the ligature, and strangulation is to be avoided.

O. H. Hund, of San Francisco, ¹⁴⁷_{Oct., '94} reports a case of extensive laceration of the pelvic floor, of fifteen years' standing, the sphincter having been severed. Three unsuccessful attempts at union were made, and finally Emmet's operation was performed with success. Six weeks later the extensive lacerations were treated and the vagina and rectum restored as nearly as possible to their normal conditions. On the twenty-fifth day the functions of all the muscles of the pelvic floor were found to be perfect, with complete retaining power of the sphincter ani.

W. H. Mayfield, of St. Louis, ¹⁰²_{May, '96} after extensive experience, insists upon the importance of avoiding traction on the perineal muscles when the operation is completed, of insuring complete abduction of the thighs during convalescence, and states that deep dissections should be practiced in every case. (See section H in this volume.)

Hydrocele.

J. L. Reverdin and F. Buscarlet, of Geneva, ¹⁹⁷_{July 30, '96} describe three cases of hydrocele in the female. In the third case the tumor was as large as the head of a foetus and extended along the entire extent of the groin. It was removed by operation, the patient recovering without accident. The case is interesting on account of the considerable size of the growth, its successive development externally in the direction of the antero-superior spine of the ilium internally and finally in the labium majorum; the formation of annular adhesions about the sac, giving the tumor a bosselated form; the sero-sanguinolent contents, and the co-existence of a uterine fibroid. A case is also recorded by A. Majewski. ⁵²⁰_{Nov. 9, 11, '96}

Lapeyre, ¹⁰⁰_{May 22, '96} in discussing hydrocele in women, states that an operation, always possible through its lack of danger, is indicated in two cases: 1. When the volume is great. 2. When there

is concomitant hernia. Complete extirpation, with destruction of the canal of Nuck and of the upper infundibulum which it may present, is the only rational treatment preventing all chance of subsequent hernia.

Menstruation.

Physiology.—To sustain his view that ovulation is not the cause of menstruation, Lawson Tait, of Birmingham, ²⁶_{Jan. 1, 1900}, adduces evidence recently furnished by Walter Heape in a paper in which the menstruation of *Semnopithecus entellus* is studied. Tait considers that this author has made a marked advance in adopting a division of the menstrual cycle into four distinct periods, each with their distinct histological characters, indicating, on the whole, eight stages. These are:—

- A. Period of rest.
Stage I—The resting stage.
- B. Period of growth.
Stage II—The growth of the stroma.
Stage III—The increase of vessels.
- C. Period of degeneration.
Stage IV—The breaking down of vessels.
Stage V—The formation of lacunæ.
Stage VI—The rupture of lacunæ.
Stage VII—The formation of menstrual clot.
- D. Period of recuperation.
Stage VIII—The recuperation stage.

Tait states that the above completely justifies the position he has occupied for many years,—that we should not speak of menstruation as occurring once a month, but we should speak of the menstrual processes occupying a whole month, for the periods of rest and recuperation (A and D) are as important parts of the process as any other; indeed, for impregnation they are probably far more so, the last (D) being probably the only essential of all four.

Byron Robinson, of Chicago, ¹¹⁹²_{Aug. 1, 1900}, in a discussion on menstruation, also argued that all evidence favors the theory that ovulation and menstruation are independent. As proofs, he adduces the fact that ovulation occurs before birth in man and other animals, while women menstruate who possess diseased ovaries totally incapable of ovulating. Menstruation frequently continues after removal of the ovaries, and is not required for the ripening and discharge of ovules. The sow seems to ovulate continually and progressively, but the ova ripen in greatest number at rut or œstrus. Robinson believes that sufficient evidence exists to show that no follicle ruptures at many of the menstrual rhythms. Women who do

not menstruate can, therefore, become pregnant. If ovulation and menstruation occurred together, coitus between healthy subjects just after the period would far more frequently be followed by pregnancy. Lastly, ovulation, in a modified form, continues during pregnancy.

Joubert, ²⁰⁶_{Apr., '96} from a study of the influence of tropical climate on menstruation, based upon over three thousand patients between the ages of 10 and 19 years, arrives at the conclusion that the reason why girls in tropical countries menstruate at a relatively earlier age than Europeans is not because of the climate, but of too early sexual excitement.

D. L. Peebles, of Navasota, Tex., ¹_{Mar.-30, '96} reports a phenomenal case of premature menstruation in a child 5 days old. The breast and genital organs were remarkably well developed at birth. C. E. Catchings, of Woodville, Miss., ¹²_{May, '96} also reports a case in which a child began to menstruate when 1 month old and continued to do so regularly for the next six months, at which time she stopped and did not begin again until three and one-half years afterward.

A. W. Johnstone, of Cincinnati, ²⁷_{May, '96} states that Stevenson, of Aberdeen University, discovered by delicate manometers that the pelvic blood-pressure varies in a woman during her menstrual life from one period to the next in a definite manner. The pressure is greatest at the commencement of the flow, least immediately on its cessation, and remains at about the same height for seventeen days, when it again begins to rise. Derangement of this cycle or insufficient pressure leads to various pathological phenomena,—headache, convulsions, nausea, vertigo, etc. Two cases were observed in which headache was accompanied by a temporary, regularly-recurring glycosuria, and the author explains this as caused by undue pressure in the floor of the fourth ventricle, leading to pneumogastric inhibition and this to hepatic inaction. When the wave occurs normally and there is no escape for the blood, owing to thickened endometrium or some similar cause, we find abnormal congestions elsewhere, vicarious menstruation, etc. When the pressure fails to reach its normal height, we find nervous disquiet, etc., and anæmic phenomena, as frequently seen in phthisis. Recognition of the existence of this wave has allowed a more satisfactory treatment and diagnosis in obscure cases than could otherwise have been brought about.

Vicarious Menstruation.—Kobern, ⁴_{Jan. 14, '96} while conceding that vicarious menstruation is usually harmless, shows that the prognosis in cases in which the vicarious bleeding takes place through the lungs should be guarded, since, under this flow, may be con-

cealed the beginning of an acute tuberculosis. He relates a case proving the point made. Joseph L. Hancock, of Chicago,¹⁹⁸ mentions the case of a woman, 31 years old, who has a discharge from the left breast which begins three days before the menstrual period. This discharge is at first whitish in color, then becomes bloody, and finally yellowish. It terminates suddenly when the menstrual flow appears, but re-appears again at the close of the uterine flow and lasts two or three days.

L. Kutner, of Berlin,⁴ states that hæmorrhage from an ulcer of the stomach is also frequently dependent upon a menstrual period. The differential diagnosis between an ulcer of the stomach and menstrual hæmorrhage from the stomach is by no means easy, and in some cases it can only be made out by resorting to a prolonged rest-cure. Want of success will indicate that no ulcer is present. A. W. Johnstone, of Cincinnati,²⁷ states that vicarious menstruation usually shows a local trouble requiring treatment at the seat of the hæmorrhage.

Metrorrhagia.

A case of incoercible metrorrhagia is recorded by Switalski in a patient, 29 years of age, who had become anæmic from loss of blood.³¹⁷ In spite of the administration of iron and nourishing food, the loss of blood continued for several months. It was impossible to discover the cause of the metrorrhagia in this case, and it was only after extirpation of the uterus that microscopical examination showed the presence of an interstitial endometritis. C. von Haven reports of metrorrhagia in a girl of 5½ years, who had had sexual intercourse with a boy of 9 years some time before.

The value of salipyrin in various forms of uterine hæmorrhage, which has been noticed by Zurhelle, Kayser, and Bigelow, has been very carefully tested by E. G. Orthmann by observations on 32 patients in Martin's polyclinic in Berlin.⁴ Fourteen were cases of purely functional menorrhagia. In 3 the menorrhagia was associated with salpingitis and oöphoritis. In the remaining 15 the hæmorrhages were irregular, and were classed under the head of endometritis hæmorrhagica; 4 of these were associated with metritis, perimetritis, or oöphoritis; 4 more were consequent on parturition or abortion, and the rest were due to previous operations on the tubes or ovaries. The salipyrin was always given in the form of lozenges containing 15 grains (1 gramme) each. Of the whole 32 cases 20 were more or less beneficially influenced by the treatment, the most marked success being obtained in the simple menorrhagia subsequent to parturition or

abortion. In no instance were any of the unpleasant by-effects ascribed to salipyrin observed, not even when 70 lozenges were given.

Labadie-Lagrave, of Paris, ¹¹⁵³₁₈₈₄, ⁴⁵¹₁₈₈₄ after remarking on the persistent character of many uterine hæmorrhages, and that even curetting the endometrium occasionally fails to relieve it, speaks of the excellent results that he has had from the topical application of a mixture of antipyrin and salol. Salol was specially selected on account of its liquefaction at a low temperature. The mixture is easily prepared by filling a test-tube one-third full of a mixture of antipyrin and salol in equal proportions and applying heat. Fusion takes place in two or three minutes, and a slightly brownish liquid is obtained. To render the mixture less liable to solidify, it is recommended to continue the action of the heat until the mixture becomes of a distinctly brown color, when the product will remain liquid for a sufficient length of time. This is gently applied by means of a tampon of absorbent cotton to the entire surface of the endometrium. The application is not at all painful. A tampon of cotton with glycerin is left in the vagina, and the patient kept in bed. Hæmorrhage is immediately arrested, and it is rare to have to make a second application.

Talley, of Philadelphia, ¹¹⁹₁₈₈₄ has used with excellent results atropine sulphate ($\frac{1}{100}$ grain—0.00065 gramme) repeated with sufficient frequency to cause dryness of the throat. In private cases the administration of the drug is preferably by hypodermatic injection. The result is so rapid and permanent that it is used almost in a routine manner in the gynæcological clinic. Lapkow ⁴²²₁₈₈₄ speaks highly of ferratin, 0.5 gramme ($7\frac{1}{2}$ grains) three times daily.

Gottschalk, of Berlin, ⁵⁷₁₈₈₄ recommends cotarnine hydrochloride. Freund had found this drug comparatively non-poisonous to animals and a very efficient hæmostatic in gynæcological practice. It is described as an amorphous powder, almost of a sulphur-yellow color, readily soluble in water, forming a solution which becomes cloudy on exposure to light, and may be administered by the mouth in doses ranging up to $\frac{1}{4}$ grain (0.05 gramme) five or six times a day. Subcutaneously, Gottschalk employed a sterilized 10-per-cent. watery solution, and in cases of profuse metrorrhagia injected 3 grains (30 drops of the solution) deep into the gluteal muscles once a day. No unexpected effects were noted, save in a few patients who did not bear opium well; in these the drug appeared to act as a sedative and analgesic; so that it was found particularly serviceable in cases in which, together with uterine hæmorrhage, there was dysmenorrhœa. In this respect Gottschalk

considers cotarnine superior to ergot and hydrastis, and he also finds it a suitable drug for protracted use.

Kallmorgen³⁹⁸_{1898, '96} employed hydrastinine in eighty-six cases of uterine hæmorrhage during the last two and a half years. The best results were obtained in simple menorrhagia, post-partum hæmorrhage, and in bleeding due to hæmatocele and disease of the adnexa. In chronic endometritis it seemed to have little effect, and it is contra-indicated in pregnancy and in cases of uterine fibromyoma and inoperable carcinoma.

Dysmenorrhœa.

William S. Gardner, of Baltimore,²⁰⁷_{Dec., '96} examined 112 cases. One of the most striking points noted is the very large number of sterile women; 44, or a fraction less than 40 per cent., belong to this class. Of those who had been pregnant, 12, or over 10 per cent., had never had a child at full term; 15 more, or 13 per cent., had had a miscarriage since the last full-term child was born, leaving less than 37 per cent. of the total number whose last pregnancy had come to full term. Without further examination, these figures would seem to indicate that, in a large proportion of patients suffering from dysmenorrhœa, there were present lesions which also interfered with conception. The most prominent lesions presented were as follow:—

Endometritis,	23
Retroversions,	14
Pyosalpinx,	17
Anteflexions,	14
Laceration of cervix and endometritis,	10
Cervical stenosis,	8
Constipation,	7
Retroflexions,	4
Enlarged ovaries,	4
Fibroids,	2
Prolapsed ovaries,	2
Lacerated cervix,	1
Membranous dysmenorrhœa,	1
Nothing found,	5
Total,	112

Of the 23 in whom endometritis was apparently the most marked lesion, 9 had had their last pregnancies terminate in abortions; 5 are known to have had gonorrhœa, and of the 8 in whom nothing further than a cervical endometritis was noted it is highly probable that a considerable number had had gonorrhœa. Only 1 case that was probably a corporeal endometritis was noted. Of the 18 retrodisplacements 13 were retroversions in which no adhesions were detected, 3 retroflexions with no adhesions, and 1 retro-

flexion and 1 retroversion with adhesions. Two other retroversions, with pus-tubes, are in the list of pyosalpinx cases.

Of the 17 cases of pyosalpinx 9 were of gonorrhœal origin, 2 probably puerperal, and the remaining 6 were due to an infection which could not be traced directly either to gonorrhœa or puerperal infection.

From these cases it is seen that 100 out of 112 patients suffering from painful menstruation, who were examined with a reasonable degree of care, were found to have some marked organic lesion of the pelvic organs. The practical conclusion to be drawn is that the treatment of dysmenorrhœa must be directed toward relieving the causative disease.

Duvelius, of Berlin, ³_{Oct., '96} states that, of all forms, that of tubal origin is the most painful. The treatment consists in encouraging the absorption of pelvic exudate by hot douches and suppositories of ichthyol 0.25 gramme (4 grains), cacao-butter 2 grammes (31 grains), to be introduced every night before retiring. Massage of the tubes and ovaries may be employed if there is no collection of purulent, sanguineous, or serous fluid in the tubes. These complications are best treated by laparotomy and excision of the tubes. Ovarian dysmenorrhœa is of very frequent occurrence, and may be due to a true oöphoritis or to simple neuralgia of the ovary. He recommends, besides narcotics, ice over the region of the ovaries, or, if objected to, hot stupes may be employed. Hip-baths, douches, tampons, electricity, and, above all, gentle massage are also recommended. Cases in which the ovaries are bound down by adhesions are relieved quickly and completely by the latter measure; other conditions give less brilliant results.

Ovarian neuralgia at the menstrual period is exceedingly difficult to cure; even castration often fails to give relief. Pregnancy seems to have a good influence, and it is advisable to favor the marriage of women with this trouble, provided it is not associated with severe hysterical troubles.

Besides these varieties of dysmenorrhœa due to lesions of the uterus or adnexa, the author lays stress upon a type of dysmenorrhœa due to general conditions, which is frequently seen in young women suffering from anæmia or chlorosis. These cases often do quite well on antipyrin or phenacetin, and especially viburnum. The fluid extract of viburnum should be given in 1-drachm (4 grammes) doses, beginning five or six days before the period. Exercise in the open air is also a valuable means of treating this kind of dysmenorrhœa. Some cases are relieved by a horseback-ride shortly before the period. Others experience the same relief after dancing vigorously.

For membranous dysmenorrhœa Duke²² July 10, '96 recommends the scarification of the os externum at intervals of three or four days between the periods. Just before the flow is expected the cervix is dilated, the interior of the uterus is thoroughly curetted and a spiral wire stem introduced; this is worn continuously during at least three subsequent periods, the patient being directed to take hot vaginal douches even when menstruating. No harm has resulted from the use of the stem, and the patient is able to attend to her ordinary duties.

Menopause.

J. Neumann¹¹⁸⁰ B.I.H.2, '96; ⁴⁹ Aug. '96 has analyzed the histories of a large number of cases of post-climacteric hæmorrhage occurring in private and hospital practice in Vienna. He first gives statistics regarding the frequency of disease immediately before the end of the menstrual life:—

Disease.	Number.	Average Age.
Carcinoma cervicis uteri,	100	45.5
Displacements and inflammations of uterus,	75	46.5
Myoma uteri,	70	48.0
Climacteric anomalies,	55	47.0
Prolapse of uterus or vagina,	55	47.0
Endometritis,	20	46.5
Carcinoma corporis uteri,	11	41.3
Ovarian cyst,	10	46.5
Pregnancy,	8	45.5
Various other affections of the genitals,	61	48.5
Doubtful conditions,	35	47.0
Totals,	500	46.5

For comparison with this he gives another analysis of 500 cases in which the menopause had occurred at least one year previously. He thinks that many of the bleedings in these cases must be referred to the influence of the climacteric:—

Disease.	Number.	Average Age.	Commencement of Menopause.
Prolapse of vagina or uterus,	112	59.0	46.5
Carcinoma cervicis uteri,	108	56.5	47.7
Senile colpitis and other senile affections,	85	55.0	47.0
Displacements and inflammations of uterus,	35	49.2	47.5
Ovarian cyst,	25	60.0	47.0
Carcinoma corporis uteri,	18	57.4	49.5
Myoma uteri,	14	56.0	50.0
Mucous polypus,	8	55.4	47.25
Various other affections of genitals,	60	58.8	44.8
Doubtful conditions,	40	59.5	46.5
Totals,	500	56.2	46.7

The analysis of these post-climacteric cases as regards the occurrence of hæmorrhage is interesting:—

Disease.	With Hæmorrhage.			Without Hæmorrhage.		
	No.	Average Age.	Menopause.	No.	Average Age.	Menopause.
Carcinoma cervicis uteri, .	100	56.2	47.7	3	70.3	48.0
Prolapse of vagina or uterus, .	24	59.0	43.6	88	59.2	47.6
Carcinoma corporis uteri, .	18	57.4	49.5			
Mucous polypus of uteri, .	8	55.4	47.25			
Senile changes in genitals, .	5	63.6	49.4	80	54.2	46.7
Myoma uteri,	4	68.0	51.3	10	53.3	49.4
Ovarian cyst,	4	54.0	45.5	21	58.2	47.7
Doubtful conditions, . . .	20	61.7	47.4	20	58.5	46.1
Displacements and inflammations of uterus, . . .	..	..	..	35	49.2	47.5
Other affections of genitals, . . .	..	..	..	60	58.8	44.8
Totals,	183	56.5	46.5	317	56.1	46.9

Out of these 500 cases, therefore, it appears that 183, or 36½ per cent., had a return of hæmorrhage after the menopause had been established a year or more. Of these, cancer of the cervix caused the bleeding in 54 per cent. of the cases.

W. P. Manton, of Detroit, ²⁰²_{July 25, '96} states there are only a few pathological states which are at all likely to be confused with fat-accumulation in the parietes, so often occurring after menopause,—viz., true lipomata, dermoids, fibroids, tumors of the abdominal wall, encysted peritonitis, hydatids of the peritoneum, and, possibly, new growths of the omentum. A little care in physical examination will readily distinguish any one of these from diffuse fat-accumulation in the belly-walls; nevertheless, he has seen such cases considered as “ovarian tumors.” A case of large unilocular blood-cyst developing in the wall of the uterus, after menopause, is described by J. C. Webster, of Edinburgh. ⁵_{Mar. '96}

J. S. Nowlin, of Shelbyville, Tenn., ¹²⁰_{Jan. '96} considers the climacteric as a diverted trophic nervo-vascular force,—a re-adjustment of nutritive forces. It is not life-endangering in itself or productive of disease. Medication, when necessary, must be directed to the ganglionic nervous system and the heart, the more important and efficient in his experience being venesection, cactina, digitalis, strophanthus, strychnia, massage, and an occasional flushing of the bowels by enema of warm water. The blood-letting, which may be limited and not often repeated, is the most direct remedial agent to the sympathetic system and paves the way for the most potent effect of other remedial agents. It does not produce anæmia, but rather tends to improve digestion and assimilation.

URINARY ORGANS.

Anomalies of the Urethra and Bladder.

W. A. Edwards, of Los Angeles, while endeavoring to pass a catheter, in a woman 80 years old, discovered that the opening

of the urethra was at a distance of six and one-half centimetres from the clitoris and situated in the median line of the anterior vaginal wall, entirely within the vulvar aperture. It was a vertical slit analogous to the male urethral opening and was not puckered or rounded. The canal was two and one-half centimetres in length and apparently traversed the bladder-wall before opening into the viscus, not unlike the course of a ureter. Careful search failed to reveal a urethra normally situated.

Péan, ¹⁴_{May 20, '95} in a young girl of 15 years, who had not yet menstruated and was affected from her birth with incontinence of urine, found on the anterior wall of the vagina, beyond the hymen, which was intact, a tumor the size of a walnut; in pressing on it with the finger he perceived that urine oozed out, not through the orifice of the urethra, but through another orifice situated a quarter of an inch below it. The patient was found to have double urethra and bladder. Excision of the abnormal urethra and bladder was performed, and the incontinence ceased. Péan added, in concluding, that this example of a double urethra and bladder was unique in medical science.

Urethritis.

Verchère ¹¹⁵⁸_{May 20; June 1, '95} asserts that he has solved the problem of the chronicity and intractableness of urethritis in women by the discovery of its cause. The submucous tissue of the urethra contains in these cases a number of small cysts filled with thick, brownish pus, some of them quite closed, others communicating through a minute orifice with the urethral canal. These latter furnish the drop of pus seen, in chronic urethrorrhœa, to exude from the urethral orifice on pressure. But in the majority of cases there exist other cysts, which, being closed, no amount of pressure can evacuate. Their presence gradually determines a thickening of the areolar tissue in which they are situated, and the urethra is felt as a thick cord when the finger is passed along the upper wall of the vagina. All intra-urethral treatment is useless in this disease, which Verchère has named "encysted glandular urethritis." Despite its gonorrhœal origin, the pus contained in the cysts is most frequently free from the gonococcus. Only one mode of treatment can bring about recovery, and that is a free incision of the lower wall of the urethra with complete removal of the cysts. One blade of a pair of scissors being introduced into the urethra and the other being in the vagina, an incision of the length of from one to one and a half centimetres is made. The lips of the incision being separated, ochre-yellow pouches the size of a millet-seed or a pea are brought to view. Each of these

cysts is dissected out, this being sometimes an easy matter. If difficulty be experienced, the urethral above and the vaginal mucous membrane below are respectively dissected from the areolar tissue, which latter is then, with its contained cysts, removed bodily. One or two sutures suffice to reconstitute the urethral canal, and the operation is at an end and recovery assured.

E. Rollet,¹⁵⁴_{Nov. 16, '94} advocates early treatment. With a special sound ending in a full tip he opens the neck of the bladder and cleanses the urethra. Lavage with corrosive sublimate (1 to 2000) or the permanganate of potash (1 to 250) gives the best results. An antiseptic crayon may be inserted or the urethra coated with a preparation of resorcin (10 to 30). The antiseptic vaginal walls act as barriers between the bladder and uterus.

J. Vigneron, of Paris,¹⁴⁸_{Oct., '94} recommends picric acid in the treatment of urethritis in the female. It may be introduced directly into the bladder, being painless, without danger, antiseptic and analgesic. Recovery takes place in from ten to twenty days.

Prolapse of the Urethra.

Henri Blanc²⁶⁶_{June, '96} states that prolapse of the mucous coat of the urethra in woman is more common, however, than it is supposed to be, and is mainly found in old women and little girls. The origin is not yet clear; however, two etiological factors may be noted,—the frequency of vesical and urethral inflammation in little girls and of frequent childbirths in old women. While the prolapse of old women is incomplete at first, later on complete, and takes place slowly and progressively, that of little girls is usually sudden and complete from the first. When once formed, the prolapsed mucous coat looks like a smooth and bleeding, fleshy tumor of variable size. A depression in the centre represents the situation of the meatus. The tumor can sometimes be reduced, but is generally irreducible. The following are the functional symptoms: Itching; pain, especially if erosions or ulcerations appear; hæmorrhage of varying intensity; micturition is usually normal. At times suppuration may be present; occasionally gangrene from strangulation, with elevation of temperature and general reaction. The prognosis is, with few exceptions, favorable. The diagnosis, which is usually easy, must eliminate urethral tumors, urethrocele, and urethral cystocele. The tumor should be reduced, if possible, and kept in such a position by means of an appropriate compressive dressing. If this does not succeed, or if, as usually happens, the tumor, cannot be reduced, it may be resected with caustics, ligature, the thermo-cautery, or by a circular excision on a level with the meatus by means of the bistoury and scissors,

followed by the suture of the prolapsed mucous coat. The author describes two cases.

Urethrocele.

According to A. Boursier, ³_{Aug. 21, '96} urethrocele may be divided into two classes: 1. True urethrocele, the most frequent form, usually due to mechanical injuries of the urethra, especially during labor. Ordinarily these small tumors communicate by a rather large opening with the urethra and contain muco-pus. 2. Pseudo-urethrocele, under which may be included: (a) cystic tumors (congenital vaginal cysts, hæmatic cysts, etc.) which have opened into the urethra and contain black pus or substances resembling the contents of sebaceous cysts; (b) lacunar dilatation of the urethra, containing one or more calculi, forming hard, irreducible tumors, resonant when a metallic sound is passed. The treatment should vary according to the variety; in true urethrocele incision or excision with suture of the urethral sac should be employed; cysts opening into the urethra should be totally extirpated, and, in case of calculus, simple removal of the foreign body will suffice.

Tumors of the Urethra.

McWeeney, of Dublin, ¹⁶_{Aug. '96} describes a case of spindle-celled sarcoma of the female urethra. The patient, aged 32, had suffered from pain in micturition for some months, and was admitted to the Mater Misericordiæ Hospital under the care of More-Madden and Hayes, who found a soft, vascular tumor, the size of a pigeon's egg, projecting from the urethral orifice. It could be traced along the urethral roof into the bladder. On removal it proved to be a typical spindle-celled sarcoma. The authors point out the rarity of this variety of growth in this situation.

In a case of carcinoma of the urethra and bladder W. H. Battle ⁶_{June 18, '96} removed the growth, closed the suprapubic wound, and established permanent suprapubic drainage.

Cystitis and Cystalgia.

William H. Bennett, of Cambridge, Eng., ¹⁰⁷⁷_{Mar. 27, '96} has found by experience that, if there is what may be called residual urine in the bladder, it is only a question of time as to when that urine will decompose, and, if the urine decompose, it will give rise to cystitis. In the large majority of women it is quite impossible for the subject to completely empty the bladder while lying perfectly flat on the back. Therefore, if women, on account of illness, are placed flat on the back sufficiently long, a certain amount of urine is almost certainly retained, and, in consequence of such retention,

changes are prone to take place in the urine which give rise to symptoms of cystitis. Cases of this kind are very common in patients who come under treatment for strangulated hernia. This is especially so when the practice of raising the foot of the bed with a view to assisting reduction is practiced. If a woman is unable to completely evacuate her urine when lying flat on the back, still less is she likely to be able to do so when the head is lower than the pelvis. For that reason, among others, he has always personally been opposed to this practice. In one of two cases alluded to the cystitis supervened after an interval of ten days, while in the other it supervened as soon as three days after the operation. The author therefore recommends that, in appropriate cases, the recumbent posture be changed to the sitting posture. The more easily excited a patient's bladder is, the more amenable to treatment is any cystitis which may occur,—not merely to the treatment by washing out, which, after all, is only palliative in many cases, but to effective treatment by drugs. Certain drugs act with remarkable rapidity and certainty, especially in chronic or subacute cases which originate quickly. Such are not, however, necessarily acute. The well-known peculiarity about these cases is that the urine very rapidly acquires an offensive odor, and in some cases this is very difficult to correct. Two drugs are particularly useful in this particular,—namely, salol and betol, the latter, especially. A dose of 5 grains three times daily will, as a rule, completely correct the odor in twenty-four to thirty-six hours. Aseptic bladder washing may, and should, in the majority of cases, be employed at the same time, although in many cases the drug itself will correct all the abnormal conditions without any local treatment.

J. M. Baldy, of Philadelphia, ¹¹⁹_{No. 10, p. 100, '96} expresses the opinion that a large percentage of female patients suffering with subacute vesical symptoms—such as painful micturition, bearing-down sensation, and a feeling that the bladder is not emptied after micturition—can be readily relieved by dilatation of the urethra. The greatest amount of practical good that has been obtained in bladder troubles by the use of the cystoscope may be attributed to the dilatation necessary to the introduction of the instrument.

L. Bleyne ¹⁴⁸_{Apr. 26, '96} reports two cases of cystalgia of two to three months' duration. After having tried all therapeutic measures, instead of having recourse to the employment of a vesico-vaginal fistula, he resorted to dilatation of the urethra for the purpose of causing artificial incontinence of urine. In the first patient this dilatation was followed on the same day by a severe vesical hæmorrhage. At the end of three weeks recovery resulted. The

second case also recovered from both the cystalgia and incontinence of urine.

Bullous Œdema of the Bladder.

Cystoscopic examination as carried out by G. Kolischer³¹⁷_{July 4, 1896} on many patients in the wards of Schauta, of Vienna, has led him to note the presence in women of a certain affection of the bladder of a special nature, intimately connected with certain gynæcological troubles. The morbid process is entirely localized in the mucous coat of the bladder. Transparent vesicles or bullæ varying in size from a millet-seed to a pea are strewn over the affected area. Whitish pseudomembranes, formed by the walls of ruptured vesicles, are to be seen floating in the liquid. The surrounding mucous coat of the bladder is quite normal in aspect. The affection described by Kolischer thus differs entirely from the generalized œdema of the mucous coat of the bladder due to certain mechanical causes, such as retroflexion of the pregnant uterus and childbirth.

The symptoms are frequent and painful micturition and a sensation of heaviness or pressure in the vesical region; fragments of pseudomembranes often appear in the urine, the elimination of which gives rise to tenesmus and is followed by evident relief. According to Kolischer's observations, this bullous œdema occurs only in cases where a periuterine exudation of inflammatory origin exists in the neighborhood of the bladder. It is especially intense in cases in which the exudation is between the uterus and the bladder or when a pyosalpingitis has formed adhesions with the bladder. After operative or spontaneous evacuation of the pus of the pelvic abscess the bullous œdema and the troubles which it provokes are not long in disappearing. When the pelvic exudation is treated by expectation the vesical affection lasts as long as the exudation and is ameliorated progressively as the latter is absorbed.

Bullous œdema may often be confused with some variety of cystitis, and especially with new growth in the bladder, it sometimes giving rise to a limited thickening of the vesical wall quite perceptible to the touch; the sensation of a hard and bulging tumor may even be experienced. When bullous œdema is diagnosed, the conclusion is warranted that the accompanying pelvic tumor is not a new growth, but purely inflammatory in origin.

Vesical injections and instillations, as Kolischer was able to convince himself, only increase the complaint. The only reasonable and efficacious treatment is one directed against the origin of the pelvic inflammatory exudation which is the cause of the vesical affection.

Enuresis.

Contraction of the bladder as a cause of incontinence is interestingly exemplified by Mayo Robson, of Leeds, Eng., ⁴⁹_{Aug., '96} who succeeded by graduated fluid dilatation in practically curing a case. The patient, a single woman, aged 30, had suffered for years from complete incontinence. On attempting to pass a sound Robson could get it no farther than the length of the urethra. Bimanual examination revealed the fact that there was practically no bladder, it being merely represented by a small hard lump about the size of a walnut. The ureters were apparently free from disease and there was no enlargement of the kidneys. The urethra was dilated by a Weiss dilator so as to admit the little finger, when it was found that the minute cavity was lined by phosphatic concretions, which were thoroughly scraped away by Volkmann's spoon. The bladder then had a capacity of only half an ounce, and although the patient was under an anæsthetic no more could be injected by any reasonable amount of force. The incontinence persisting after the operation, the bladder was washed out daily with boric lotion, but on each occasion the urethra was compressed around the nozzle of the syringe and moderate force was used to increase the pressure of the liquid against the walls of the bladder in the hope of thus augmenting the capacity of the organ. After a few days the incontinence ceased and the patient was told to hold her urine as long as possible. This procedure was continued for about three months, after which she was able to hold seven ounces of urine. Even when up and about she had not to micturate for five hours. In order to keep the urine aseptic while undertaking any operation on the urinary passages Robson usually orders the patient to take 5 grains (0.32 gramme) of boric acid and 5 grains (0.32 gramme) of salol in wafer-paper thrice daily,—a treatment which he also employs with success in his cases of post-operative urinary fever.

J. Glas ⁶⁵⁸_{No. 6, '96} treated a case by Gersuny's method. Having made an incision around the meatus, at a distance of two millimetres, he drew out the urethra a distance of 2.5 centimetres, and, having produced a torsion of two hundred and seventy degrees, fixed it by several silk sutures. Retention of urine for two days after operation necessitated the use of the catheter, but after that micturition became normal.

G. Blech, of Detroit, ⁵⁹_{Sept. 21, '96} successfully treated a case of nocturnal enuresis, in a girl 14 years old, by means of the test-operation, which consists in vertical incisions at both sides of the meatus urinarius, transforming the vertical wound to an horizontal by passing sutures through the upper and lower ends of the

incision and bringing the margins into exact approximation. A few more fine stitches closes the figure-of-eight opening. By this procedure the tissues around the urethra become thickened on both sides and the traction exercises also pressure upon the urethra. The resistance of the canal is increased and greater force is necessary to expel the urine.

Anomalies of the Ureter.

Wölfler, of Prague,⁸⁸ observed a girl in whom a ureter discharged itself from the region of the vestibule. In reviewing the subject the author shows that the ureters sometimes empty themselves into the seminal vesicles and the vas deferens in the male and into the uterus and vagina in the female, and sometimes end blindly under the vesical mucous membrane in the region of the trigonum. A malformation of this last description would occasion a prolapse of the vesical mucous membrane and cystic degeneration of the kidney, together with numerous other complications. In 10 cases the ureter opened into the vestibule; in 2 of these 10 the bladder was absent. When only one ureter opens in this manner the patient suffers from incontinence of urine, and yet can pass a quantity from the bladder daily.

Morestin, of Paris,⁷_{Oct., '94}; ²_{Dec. 29, '94} describes a case where the ureters were double from kidney to bladder on each side. The kidneys seemed normal. On each side the pelvis was double, a ureter springing from each half-pelvis, placed vertically one above the other. The pair of ureters on each side ran to the bladder united by cellular tissue, but nowhere fused. The posterior both opened into the bladder at the normal point, the two orifices marking the limits of the base of the trigone. The anterior right and left ureters opened on each of the two lines forming the sides of that triangular area. The left opened lower down, much nearer to the beginning of the urethra than the right. All four orifices were valvular and perfectly patent. Only two equally complete cases have been recorded. The genito-urinary tract showed no sign of disease. The parts were taken from a female subject in the dissection-room. The cause of death is not stated. F. Colri,⁸³⁶_{Aug. 21, '96} also reports a case in which the left ureter discharged itself from the vulva. In this case the ureter was exposed by a suprapubic extra-peritoneal incision, incised, and grafted into the bladder. The result was excellent.

Mackenrodt, of Berlin,⁴_{Dec. 17, '94} reports a case in which a fistula connecting a ureter with the womb was cured by two operations. In the first operation the ureter was dissected free, its lower end cut across, an external ureteral fistula formed, and the uterine

sinus closed. By a second operation the ureteral end was connected successfully with the bladder.

F. Westermarck, of Stockholm, ⁸¹⁷_{Feb. 10, '96} reports a case in which he successfully implanted the ureter into the bladder by means of the graft recommended by Büdinger. In this case the ureter had been injured during the removal of the uterus by the sacral route. (Report of Corresponding Editor Eklund, Stockholm.) Kramer, of Altona, ³⁹⁸_{Mar. 2, '96} also reports a successful intra-peritoneal grafting of the ureter into the bladder, that canal having been injured during the removal of the uterus. Thiéry, of Paris, ³_{Jan. 9, '96} reports a case of Rouffart's in which the ureter was also successfully grafted into the bladder. Krug, of New York, ⁹⁶_{Feb., '96} and Pozzi ¹⁴_{Mar. 27, '96} describe similar cases.

Catheterization of the Female Urinary Tract.

Howard A. Kelly, of Baltimore, ²⁷_{July, '96} calls attention to the advantages of a renal catheter devised by him for the purposes of emptying fluid accumulations in the renal pelvis, in diagnosing and passing strictures of the upper ureter, and in differentiating soft, malignant tumors from sacculated accumulations which could be evacuated. The instrument is made of silk or linen, coated with shellac, is 50 centimetres (20½ inches) long and from 1½ to 3 millimetres in diameter. Stylets are provided in a case for flaccid catheters. The instruments are kept in glass tubes plugged at the end with cotton, and are sterilized by washing with warm water, then with a 1 to 1000 bichloride solution, then again with warm water. They are cooled in an ice-chest for an hour before using. In introducing the catheter, the bladder is first emptied, and a No. 8, 9, or 10 cystoscope is passed in to bring the ureteral orifice into view. Then, after dipping the point of the catheter in sterile boroglyceride, the instrument is brought into position for introduction,—over the operator's left shoulder for right ureter, or right shoulder for left ureter. Finally, with thumb and forefinger protected with sterilized finger-stalls, the point of the catheter is inserted in the speculum, engaged in the ureteral orifice, and gently pushed on up to the kidney. When the top of the renal pelvis is reached the catheter begins to coil in the bladder. From 12 to 14 centimetres (5 to 5½ inches) of the catheter is left outside, making the distance from external urethral orifice to top of pelvis of kidney about 36 centimetres (14½ inches). The catheter holds about 1 cubic centimetre (15 minims), and when the lumen is filled the flow begins in intermittent drops from the normal kidney, in a steady stream from the obstructed pelvis.

A block of wood, with an augur-hole, holds the tube while

urine is running. Among the cases in which the renal catheter has been of use to its inventor are: abscess of upper left ureter, pyonephrosis with renal colic, hydronephrosis, and pyelonephritis.

In this connection Kelly ⁵⁹_{Aug. 2, '96} states that stricture of the lower extremity of the ureter can be diagnosed without any operation by using the cystoscope, the bladder being dilated with air by posture. It can be improved by gradual dilatation by a series of hollow bougies (catheters) and without a kolpo-ureterotomy. A stricture, through which a No. 5 (five-millimetre diameter) bougie is passed every day for several weeks, will still hold back the urine if the walls of the ureter above have lost their contractility. Pyo-ureter and hydro-ureter can be diagnosed by drawing off, in a few minutes, such a quantity of fluid as it is manifestly impossible for the kidney to secrete in that amount of time. Pyo-ureter and pyelitis can be cured by washing out the ureter and pelvis without any preliminary cutting operation to disclose the ureteral orifice, as in the kolpo-uretero-cystotomy of Bozeman. Variations in pressure in the column of fluid in a distended ureter can be demonstrated by a manometer attached to the ureteral catheter.

Brown ⁷⁶¹_{Jan. '96} ²_{Mar. '96} states that, with Brenner's modification of Leiter's cystoscope, he has found little or no difficulty in catheterizing the ureters in the male or female. With the bladder containing, if possible, from 150 to 200 cubic centimetres ($4\frac{1}{2}$ to $6\frac{1}{2}$ fluidounces) of fluid, or even more, he passes the anterior cystoscope and takes a complete survey of the bladder. This having been done, he replaces it with the Brenner instrument, which is passed with the stylet fixed. The ureteral orifices are searched for and, when these are found, the stylet is removed and the catheter inserted and passed nearly to the inner opening of the canula. The ureteral orifice is again sought for and the catheter passed into it. To prevent kinking of the catheter and to guard against exerting undue traction upon the ureteral orifice the cystoscope must be kept in line with the catheter so long as the latter is within the ureter.

Pelvimetry.

The use of pelvimetry in gynæcology is illustrated by a case reported by G. W. Dobbin, of Baltimore. ²⁷_{Aug. '96} The patient lies on her back, with the thighs and knees slightly flexed and the head and chest elevated by a small pillow, relaxing the abdominal muscles. The examiner stands on the left, facing her, and, with the palmar surface of the open left hand directed downward, he makes, with graduated pressure, deep palpation in the median line, directly over the superior strait, feeling for the promontory of the sacrum

with the tips of the fingers. When the promontory is felt distinctly the fingers are swept over it to gain a familiarity with its position, and then allowed to rest at a point directly above it, so as to avoid interposing the thickness of the abdominal walls in making the measurement. This fixes the posterior point of the conjugate diameter. The free hand now determines the anterior point of the diameter by pressing down with the middle finger behind the symphysis directly over its most prominent point. The finger is then turned up and an indentation made with the nail on the palm of the obstetrical hand. Keeping the hand rigid, it is raised from the abdomen and the distance between the tip of the finger to the nail-mark is measured, and this is the *conjugata vera*.

Massage.

The Thure-Brandt method of massage formed the subject of several eulogistic papers. Among these may be mentioned Sofie A. Nordhoff, of Washington ⁶¹_{Mar. 16, '96}; G. Balfour Marshall, of Glasgow ²¹⁸_{Mar., '96}; J. Heitzmann, ¹⁸⁹_{Nov., '96} and R. Hogner, ⁶¹_{Jan. 26, '96} of Boston.

W. H. Rumpf, of Chicago, ²⁷_{Jan., '96} in a paper before the Chicago Gynæcological Society, gave the technique of pelvic massage as recommended by Thure-Brandt. The patient should lie with her hips resting on the end of a low couch, with the thighs and legs flexed and the feet resting on a chair placed about a foot from the end of a couch. The operator sits at the left of the patient and introduces one or, better, two fingers of the left hand into the vagina, passing his arm under the left knee of the patient. The purpose of the fingers in the vagina is to raise or fix the parts to be treated. The massage may be done solely with the right hand.

The first objection commonly made to massage is that it arouses erotic sensations and may lead to masturbation. There is, however, very little irritation if the fingers are kept on the floor of the perineum, away from the clitoris, and perfectly quiet.

After having introduced the fingers of the left hand the right hand is placed on the abdomen, passing from above under the skirts, which have previously been loosened at the waist. The patient is entirely covered; she is resting on an ordinary couch, and not a fear-inspiring operating-table, and will give infinitely less trouble, as regards contraction of the abdominal muscles, than when in the usual position for examination. The massage may now be commenced. Great tenderness may make this difficult, but is not a contra-indication, because tenderness alone is an indication for massage. It should consist of gentle, circular motions in the direction of the venous circulation of the organ to be manipulated. Brandt himself gives this rule: "Begin all mass-

age gently, more in the surrounding of the diseased part, and when the first tenderness has disappeared bear on more heavily, taking short rests in between. Stop the massage as gently as you began, and finish by placing the hand flat on the abdomen or by making a few short, vibrating motions."

This procedure should be repeated daily; the time of each treatment should be about ten minutes. Menstruation is not necessarily a contra-indication; in fact, the treatment will often be found most beneficial at that time for the relief of dysmenorrhœa.

In the discussion E. C. Dudley stated that Rumpf had treated several patients by massage whom he had referred to him, and the success had been gratifying. In two or three cases the uterine appendages were perhaps saved from removal,—that is, the indication for removal would have been sufficient in the minds of many operators. The treatment is not applicable, unless carried out for a very long period, in cases of prolapse of the uterus when it is due to relaxation of the pelvic floor. There is a disposition among Americans to want something and to want it right away. This treatment does not meet the desire for prompt and rapid results. If the same patience could be used in the application of massage that is used by Brandt and some of the European operators, intractable cases, even of prolapse of the uterus, might be much more frequently benefited or cured. Massage is chiefly curative in long-standing chronic inflammation of the pelvic organs, and especially in cases with exudates and adhesions without the presence of pus. The treatment appears to rub out the exudates and often to break or stretch the adhesions. Massage is a very much neglected department of gynecology.

Mme. Peltier²⁰⁰⁰ considers Thure-Brandt's method of great value in chronic parametritis, dysmenorrhœa, and amenorrhœa, these being its true indications. It is dangerous in all acute affections accompanied by fever or suppuration.

An instructive discussion on this subject took place at a meeting of the Paris Société de Chirurgie. Pozzi⁶⁷⁸ presented specimens from a case illustrating the injurious effects of massage in suppurative lesions of the appendages. A patient suffering from metritis and double salpingo-ovaritis, after an attack of pelvic peritonitis diagnosed as hæmatocele, was treated by massage, the operator being a skilled one. The treatment was badly borne and caused no improvement. Pozzi afterward performed laparotomy and extirpated both tubes, which presented the external appearances of pyosalpinx. Outside of the left tube there was a small purulent area. On opening the tubes the left one was found to contain blood and the right a rose-colored pus. Under the influ-

ence of the pressure exercised during the massage, rupture of the vessels and hæmorrhage in the tubes had evidently occurred. The same pressure might also have driven pus out of the tube, thus explaining the purulent area found on the wall of the pelvis at the outer extremity of the tube. Pozzi believed that massage should be reserved for chronic cases in which there was no suppuration. Bouilly reported several cases illustrating the bad effects of massage. A woman with neoplasm in the posterior *cul-de-sac* was submitted to massage, when suppuration of the tumor took place, causing the death of the patient. Another case of simple retroversion suffered the most painful symptoms after massage, and a third was confined to bed from its effects, though she had only a slight ovarian affection. The indications and contra-indications of the treatment should be clearly defined. Lucas-Championnière had also observed similar ill effects and had been recently obliged to perform laparotomy in one such case and hysterectomy in another. On the other hand, Routier stated that he had made use of massage in his practice for the past eight months with good results, but that he employed it only in cases in which no lesion existed. Monod regarded the method as an excellent one when suppuration was not present, and in this opinion the members generally concurred, stating that they wished only to call attention to the dangers of its abuse.

[A clue to the cause of these untoward results reported is, perhaps, suggested by an instance reported by Ziegelroth,³⁷⁴ in which the patient had been sent to a midwife by her physician for the application of massage. The reverse of satisfactory progress being made, the midwife gave as reason that she could not satisfactorily use her fist in the vagina. Ziegelroth points out that physicians are often to blame for handing over to an outside person a case for massage without knowing anything definite about either the principles or practice of that therapeutic agent or concerning the ability of the person to whom the case is referred.]

E. Hugon³⁷⁵ insists upon the rôle played by constipation in many uterine diseases, especially metritis and deviations. In such cases massage is superior to the use of purgatives, and the technique is most simple. The hands being moistened with vaselin, slight friction is made over the entire abdominal wall so as to accustom the muscles to pressure later on, the movements being made in the form of a circle around the umbilicus. When the wall has completely relaxed, the large intestine is grasped between the hands or the fingers and gentle, methodical pressure exercised upon it for about five minutes. This is painful to the patient, and care must be taken not to produce ecchymoses. The sitting is

finished by slight slaps with the cubital border of the hand on the abdomen, to excite contraction of the intestinal muscles and increase peristalsis, the natural direction of the large intestine being followed by the hand.

Instruments.

A new pessary for retroflexion, designed by M. Bourcart, of Geneva, ⁴⁸_{Aug. 76} has a cradle-shape similar to Schulze's or Vulliet's pessary, differing from these by the entire absence of the posterior arch. It has two lateral branches, *a a* (Fig. 1), uniting in front and forming a spring. It is usually made of a wire or steel spring, softened at its extremities by heat and covered with rubber, though the author prefers it made in soft German silver covered with rubber, as it is then both malleable and elastic. The two branches are curved upon themselves at their posterior extremities and form a loop presenting an inclined plane, on which the base of the broad ligament will rest. The elasticity of the spring, which tends to open the branches, keeps the pessary in place, while its anterior convexity rests behind the symphysis pubis. The branches, pushed back by the lateral walls, approximate behind the cervix and prevent the fundus from returning to its retroflexed position.

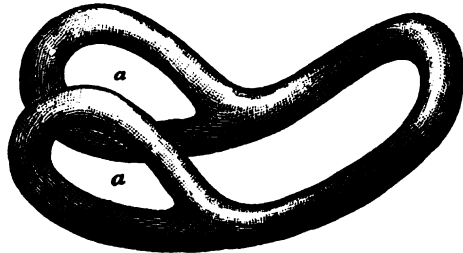


FIG. 1.—NEW PESSARY FOR RETROFLEXION.
(BOURCART.)

Annales de Gynécologie.

The largest diameter of the insertion of the broad ligaments (Fig. 2) having reached beyond the upper curve of the branches, the ligaments bear falsely on this oblique plane, and the fundus of the uterus tends to fall forward, while the tension of the lateral *culo-de-sac* and the vaginal vault render backward torsion of the ligments impossible, the uterus thus keeping a normal position by means of its own weight. The pessary only having lateral and anterior points of support, the passage of fæces through the rectum is in no way impeded,—an important point.

In applying the pessary the patient is placed in a gynæcological position, the instrument is held between the thumb and index finger of the right hand, and, approximating the two branches by slight pressure, it is introduced without turning it on its side, then pushed gently forward; with the index finger in the vagina the branches are now placed on the sides and behind the cervix, care being taken that the upper curve clears the base of the broad liga-

ments (Fig. 2), so that the branches may be lodged for two-thirds of their length in Douglas's *cul-de-sac*.

A new cervical dilator, devised by J. N. Upshur, of Richmond,¹¹⁹²_{Mar., '96} is claimed to produce better and more permanent

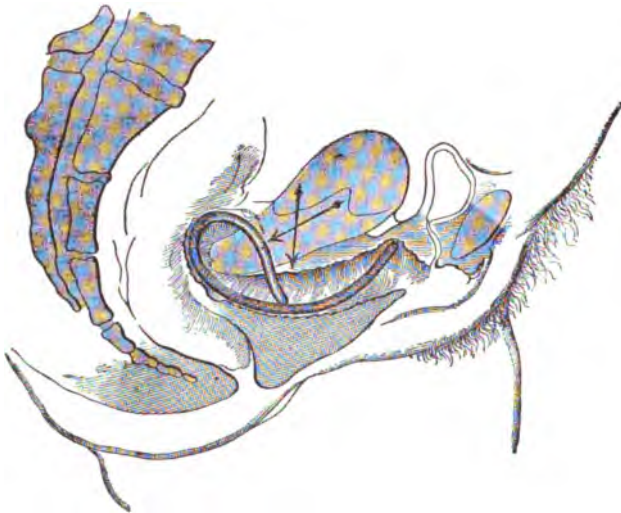
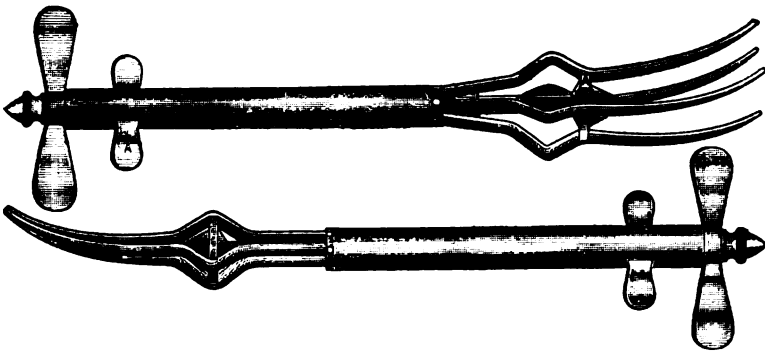


FIG. 2.—NEW PESSARY FOR RETROFLEXION. (BOURCAET.)

Annales de Gynécologie.

results by its uniform stretching of the cervical fibres. In construction the instrument is fully up to the requirements of modern asepsis, the removal of a single screw in the handle separating



CERVICAL DILATOR. (UPSHUR.)

American Gynecological and Obstetrical Journal.

all its parts; it is much lighter than Goodell's dilator; it does not obscure the view through the speculum (a bivalve may be used) as other dilators do. The force is applied by a screw turned by a handle in the end, similar to an *écraseur*, forcing forward a pyra-

midal body which renders the blade sufficiently rigid and diminishes, by the more uniform application of the force, the risk of laceration. Twenty-two turns of the handle open the blades to the full extent; therefore, by counting the turns made, the approximate amount of dilatation may be computed.

The defect of two-bladed dilators is that the stretching is chiefly of the anterior and posterior fibres; the lateral are scarcely stretched. This explains the tendency, almost inevitable, to subsequent relapse. Four blades, on the other hand, as in the instru-

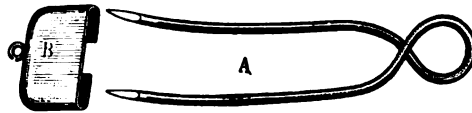


FIG. 1.



FIG. 2.

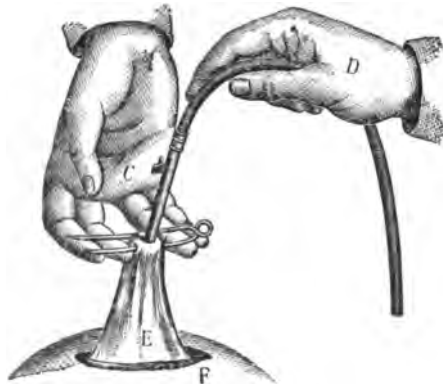


FIG. 3.

DOUBLE-NEEDLE OR CYST ELEVATOR. (BORCK.)

Fig. 1.—A, elevator; B, protecting cup. Fig. 3.—C, right hand of assistant; D, Right hand of operator; E, the cyst; F, abdomen.

Medical Mirror.

ment offered, dilate equally in all directions, equally stretching all fibres of the cervix and diminishing, if not entirely removing, the tendency to relapse.

Edward Borck, of St. Louis, ⁶⁰⁸_{Sept. '90} describes a double-needle or cyst elevator devised by him. The above illustration (Fig. 1) shows the instrument, half the smallest size. Fig. 2 shows how the needle is introduced after the abdomen is open. Instead of clamping the pedicle, one or two of these needles are thrust through it, transfixing the pedicle, and then a strong ligature is tied around the pedicle below, and separating the stump with cyst

above the needle. If the pedicle is to be treated extra-abdominally, it is brought to the lower part of the incision, the needle lying crosswise upon the abdomen and held there securely. Fig. 3 explains itself.

Augustin H. Goelet ²⁷_{Sept., '96} describes his vaginal speculum, the special advantages of which are: 1. That it may be used as a perineal retractor in both the dorsal and lateral postures, the shank joining the two blades being short so that the couch does not interfere with its use. 2. That it is self-retaining in both postures without the support of the hand. 3. That it is smaller and lighter and in every way more convenient than the ordinary Sims speculum, which it is intended to supersede. 4. That it may be used without the assistance of a nurse, in both dorsal and lateral positions, and can be held with less fatigue than the Sims instrument.



VAGINAL SPECULUM. (GOELET.)

American Journal of Obstetrics.

A ligament-carrier for Alexander's operation, devised by J. Frank, of Chicago, ²⁷_{Aug., '96} is shown in the accompanying cut.

Schuyler C. Graves, of Grand Rapids, Mich., ⁹_{Jan., '96} has used a new method of pedicle-ligation in abdominal surgery, which is shown in the cuts. The loops, it will be seen, are fixed by passage through the substance of the pedicle at points on opposite ends of their long diameters,—viz., in the centre and circumference of the pedicle.

A new uterine dilator was shown to the New York Academy of Medicine by M. Lesser, ⁸¹⁴_{Mar., '96} who said that it has been proved, by experiments with colored solutions, that, by the use of sounds and ordinary dilators, any fluid in the uterus is liable to be forced into the tubes. The dilator in question has not this fault. It is a large, conical-pointed tube, with free exit for fluid, and made in sets of different sizes. With these instruments he has been able to safely dilate the uterus, in a period of six minutes, to a size sufficient to admit the proper use of a curette.

S. Marx thought that such instruments might prove successful in the hands of gynecologists, but doubts very much whether they would be of much value in an obstetrical emergency. The instruments were too long, and the mere fact of introducing ten or fifteen such instruments is, to say the least, neither wise nor



ROUND-LIGAMENT NEEDLE. (FRANK.)
American Journal of Obstetrics.

necessary, but dangerous. In his opinion, the hand furnished the best dilator.

Lesser claimed that this instrument had proved serviceable in a case in which he was unable to dilate manually. There was no harm in having the instrument too long, but it might be very awkward if it were not long enough.

J. W. Long, of Richmond, Va., ⁵⁹_{Aug. 10, 76} has devised an improved uterine dilator, which is made in two sizes. The smaller one has smooth, small blades, so that it is readily introduced into even a

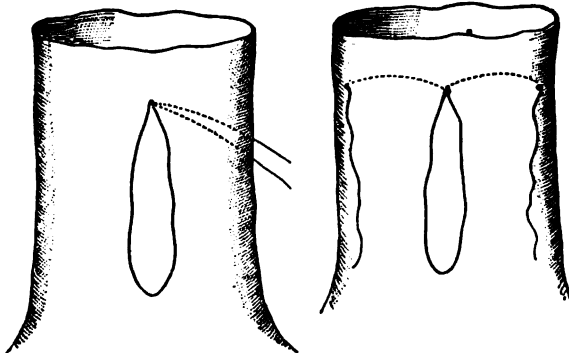


FIG. 1.

FIG. 2.

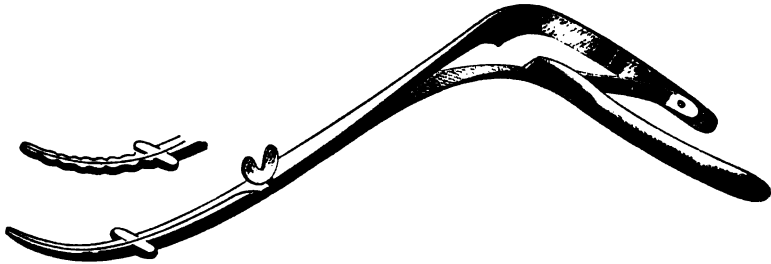
PEDICLE-LIGATION. (GRAVES.)

Medical News.

“pin-hole os.” The ordinary dilator is too blunt for such cases, and cannot be introduced without first enlarging the external os with a sound or “boring” into it with the point of a scissors. The blades “feather” just enough to keep them from slipping out, while the shoulder gauges the depth of introduction. The

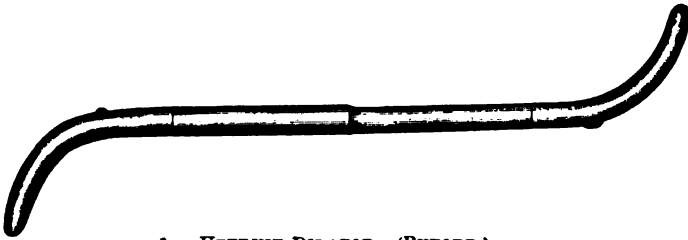
joint is fastened by a thumb-screw, which is easily removed; this is only necessary when the instrument is to be cleaned.

Henry T. Byford, of Chicago, ⁶¹Mar. 2, '96 showed to the Chicago



IMPROVED UTERINE DILATOR. (LONG.)
Medical Record.

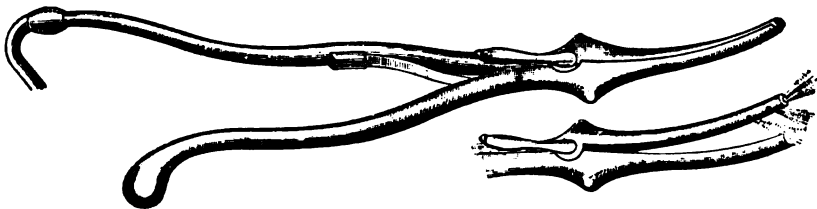
Gynæcological Society a set of uterine dilators designed for the purpose of keeping the cervix moderately dilated, and thus maintaining uterine drainage in cases of endometritis with imperfectly developed or contracted cervixes. These are stiff in the centre,



• UTERINE DILATOR. (BYFORD.)
Journal of the American Medical Association.

but will bend quite easily on the end. They can be used in a retroverted or an anteverted uterus.

Harris B. Adler, of New York, has devised a new intra-uterine irrigator, dilator, and Récamier curette combined. The



UTERINE IRRIGATOR. (ADLER.)
New York Medical Journal.

subjoined cut shows the instrument both closed and partly opened. It is capable of carrying a stream sufficiently large to wash away *débris* to an extent not attained by any instrument heretofore in the hands of the profession.

DISEASES OF PREGNANCY.

By A. LUTAUD, M.D.,

ASSOCIATE EDITOR,

PARIS.

Fertility and Sterility.

Parvin, of Philadelphia, ¹⁴⁴_{Nov. 78} expresses the opinion that pregnancy often occurs at the end of menstruating life.

[I have observed this fact a great many times, and agree with Parvin when he says that we must bear in mind that the end of menstruating life is usually attended by the return of sexual activity, which is shown by various symptoms, and especially by pregnancies that could not be obtained between the ages of 30 and 40.—A. L.]

The *Union Médicale du Canada* states that, in virtue of a law recently enacted in the Province of Quebec, Canada, 100 acres of government land are allotted to each family showing at least twelve living children, the issue of legitimate unions. Up to date no fewer than 174,000 acres of the best arable land have been distributed among 1742 heads of families, and yet there are malcontents in their ranks. Families numbering 20 children and upward are by no means rare, and their heads consider themselves as entitled to special grants. One French-Canadian demands no less than 300 acres, basing his claim on the fact that he is the parent of 36 living legitimate children. Another can only display 17, but as his wife is only 30 years old, and in five years gave birth to triplets twice, to twins five times, etc., he also considers himself as entitled to special favors.

An interesting case of fecundity is that of a lady residing in Auxonne, ²⁶_{Nov. 1, 78} 23 years of age, who has just given birth to four female children, all perfectly constituted in every respect. The first three were born on June 3d, but the fourth did not see the light until two days afterward. The mother, who has been married three years, had a son as her first-born; then came twins and, finally, quadruplets.

Latzko, ⁸_{Jan. 10, 78} speaking from an experience of fifty cases, states that mollities ossium is associated with fertility. The total average fecundity of the fifty was 4.9, and 1.75 at the time of the

(G-1)

onset of the disease. Osteomalacia, in these cases, was originally diagnosed as rheumatism of paralysis; indeed, in its earlier stages, the disorder is easily overlooked. Rehrer, in the discussion, stated that osteomalacia was very common in certain places. Since 1881 he had observed about forty-five cases in Heidelberg. During the course of nearly every academic term there were one or more pronounced cases in the wards of his hospital. Most of the patients were lean, cachectic, poverty-stricken, and prematurely aged, but a third of the total were well-fed wives of butchers, bakers, inn-keepers, and other flourishing tradesmen. Von Braun and Chrobak did not believe that osteomalacia was so frequent as Latzko's unusually large series might indicate. Von Winckel, however, relying on thirty years of observations, considered that Latzko's researches pointed to the truth. The discoveries of pathological anatomists in the dead-house, independently of cases under the care of gynecologists during life, confirmed this theory that osteomalacia is still far from rare.

Chouvarsky, of Kieff, ⁴⁸ records the results in eighty cases taken from the practice of Rein, in which he examined the spermatozoa in the genital organs after sexual connection. He noticed that the semen always remained in the *cul-de-sac* and that the spermatozoa alone entered the womb through a sort of mucous plug obstructing the os. This plug acted as a sort of filter, having the greatest importance on the vitality of spermatozoa. As a rule, the latter could be found in the womb one hour after sexual intercourse. Chouvarsky insists upon the frequency with which sterility is due to the male. Out of the 80 cases reported 13 could surely, and 22 probably, be attributed to the absence of spermatozoa in the seminal fluid.

[Although the proportion given by the author is very great, it is, nevertheless, true that sterility is often due to the male. I found the absence of spermatozoa in 12 per cent. of my cases.—A. L.]

Treatment.—Bell, ⁴⁵¹ expresses the opinion that endometritis is the one great cause of sterility, and not only of sterility, but of flexions and oöphoritis also. This being the case, the treatment of these affections is not difficult and leads to a happy termination of the disease. To carry it out successfully, it is necessary to insist that, during the process, the sexual organs should be kept quiescent. According to Bell, recovery is greatly encouraged if the treatment is begun by curetting the endometrium. Weekly or biweekly applications of iodized phenol to the canal are then commenced, and supplemented by the introduction of a tampon saturated in the glycerin and alum or of boric-acid solution. If

the treatment be carried out thoroughly, he thinks the time occupied in procuring a satisfactory result will be very materially diminished.

In this connection it might be well to note a case recorded by Blake⁹⁹ in a healthy woman treated for sterility, who died soon after an operation performed to straighten the womb. This case is of practical interest, for we are generally inclined to consider the active treatment of sterility as quite benign.

Kisch¹¹⁶ ascribes sterility in the female to the result of some form of pelvic peritonitis, to constitutional affections, to chronic local inflammations or catarrhs, or dyspareunia. He states that ordinary baths,—partial or complete,—douches, compresses, etc., are able to act on inflammatory deposits, together with mineral waters, which increase the secretion of the intestinal tract. The baths of Elster, Franzensbad, and Marienbad, endowed with ferruginous properties, or the saline baths of Kreuznach, etc., are specially indicated. Sterility dependent on anæmia should be treated at places like Pyrmont, Schwalbach, Spa, etc. For catarrhal conditions alkaline springs such as those of Ems, Vichy, etc., should be resorted to; or, should the secretion be excessive, more benefit might be derived from the astringent waters containing sulphate of iron, namely, Alexisbad, Levico, etc. Excessive corpulence as a cause of sterility should be treated at Marienbad, Tarasp, Friedrichshall, or Püllna. The results of vaginismus may be alleviated by the warm springs of Schlangenbad, Wildbad, etc. Finally, dyspareunia, an important cause, in the author's estimation, may be improved by baths or douches of water containing carbonic acid, as also by residence at an altitude or by the sea.

Gustav Loimann¹¹⁶ recommends very highly carbon-dioxide baths in the treatment of sterility. Although these baths have come down to us from antiquity, yet their simplicity and ease of application have not been conducive to their employment. These baths increase the sexual excitability, especially in women, and are a valuable remedy for amenorrhœa or deferred menstruation. The use of natural carbon-dioxide baths is easy and pleasant. The clothing should be so arranged that it will not embarrass respiration, and the lower part of the body is immersed. The duration of the bath is from eight to fifteen minutes. In special cases the mud-bath may be combined with these.

Diagnosis of Pregnancy.

R. Evans,⁴⁰ gives a sign of pregnancy,—namely, umbilical depression. The author states that during the first two months of pregnancy the normal umbilical depression is increased because

the uterus sinks into the pelvis and draws down the bladder by means of the urachus, which is inserted into the umbilicus. As is well known, the anterior neck of the uterus and the anterior vaginal wall are attached to the base of the bladder. The bladder is connected with the umbilicus by the urachus, the superior false ligament, and with what may be termed the two hypogastric ligaments. The author suggests that this mechanical antagonism may account for some of the vesical irritability of early pregnancy. In women the umbilicus is naturally larger and deeper than in most men. But in the early days of pregnancy, particularly in primiparæ, it becomes unduly large and deep. The tonus of the abdominal wall in primiparæ notably depresses the uterus, and the gas, which is peculiarly apt to be generated in early pregnancy, may also assist in such depression. Therefore, it would seem that in early pregnancy there is a threefold cause for depression of the umbilicus.

Landau¹⁹_{May 11, '96} believes that the exact estimate of the beginning of pregnancy is not possible, as apparently the ovulation occurs independently of menstruation. The size of the uterus is also an unsafe guide in the early months; the form and consistence of the uterus is more reliable. It is enlarged evenly and in its transverse diameter; so that the anteflexion is increased, the vaginal portion is drawn up, the vagina elongated, while the anterior vaginal wall appears tenser than otherwise. The consistence is softer, the sensation being as though the examining finger were pressed in soft butter. Hegar's sign may be recognized in 30 per cent. of the cases; the same sensation as is perceived by palpating the lower uterine segment may be obtained by palpating the tubal angles; the consistence of the anterior and posterior uterine walls is irregular; usually the anterior is softer and looser than the posterior, which probably has some relation to the attachment of the placenta. In the examination attention should be paid to the fact that one cannot recognize all these signs at one time, as the uterine contractions soon occur and interfere. It is necessary to examine frequently. The other usual signs of pregnancy should also be taken into account.

Landau's paper was based upon over two hundred cases of pregnancy, from the third to the twelfth week, and refers only to the normal position of the uterus.

Noble, of Philadelphia,¹⁴⁷_{Feb. '96} states that when a woman misses her menstrual period she at once thinks of pregnancy, and under certain circumstances—such as the desire for children or, on the other hand, the absence of a marriage tie—she becomes very anxious to know the facts early. The author thinks that it is

possible to furnish the desired information ninety-nine times out of one hundred by bimanual palpation between the sixth and twelfth weeks. He relies particularly on Hegar's sign, of which little or nothing is said in the text-books on obstetrics. This concerns the relation of the cervix to the body of the uterus.

The shape of the unimpregnated uterus is pyriform, flattened from before backward. When the cavity of the uterus contains growing ovum the corpus and fundus develop with great rapidity, while the cervix grows but slowly. By six weeks the ovum has grown sufficiently to make the corpus spheroidal in shape, while the cervix has altered very little; thus there is formed a spheroidal body resting on a cylinder, and the sphere juts out from the cylinder prominently in every direction. The corpus, too, is softened and gives a sense of semifluctuation when palpated bimanually. Only two other conditions besides pregnancy can cause this sign: 1. Hæmatometra, due to imperforate cervix, which is very rare and has a suggestive history. 2. Intra-mural fibroid, which does not give semifluctuation nor uniform enlargement of the uterus. Corroborative evidences of pregnancy, in the early months, are: violet discoloration of the vagina, most marked beneath the urethra; velvety softness of the vaginal walls; marked pulsation in vaginal and uterine arteries. Softening of the cervix Noble considers of much less importance than is usually assigned to it, and a sign on which very little dependence can be placed.

Frank ²_{Jan. 26, '96} publishes a series of tables on the alleged proofs of full-term gestation, and the results are essentially negative, shaking many well-known opinions; the length of the nails is of little value, and the temperature of the newborn child is a fallacious sign. The latter may be influenced by partial asphyxia during birth or other circumstances not peculiar to nine months' infants. When the circumference of the head is under 32 centimetres (12.48 inches) the child can hardly be mature, but premature children may have heads of a greater circumference. Every case must be judged on its own merits; the child's sex and the number of previous pregnancies should be taken into account. Frank warns us against supposing that a mature foetus has necessarily been borne the full term in its mother's uterus.

A case of pregnancy mistaken for an ovarian cyst is recorded by Reverdin, of Geneva. ¹⁴⁷_{Feb., '96} A woman, 24 years old, was operated upon for a large ovarian tumor and cured. Nineteen months later she returned on account of a greatly enlarged abdomen, in which a tumor was perceptible on palpation, which extended to the right side and gave distinct fluctuation. The patient had had her period at different times since the operation, but very faintly.

Operation was determined upon and performed July 13th. Solid adhesions were found between the abdominal wall and coils of intestines, and in the attempt to release these the bowel was opened. The tumor, when exposed, did not look like an ovarian cyst, and contained numerous blood-vessels. On puncture turbid fluid was evacuated, but the flow soon ceased, and on drawing out the trocar a portion of navel-cord followed. Since the four months' foetus had little prospect for further development, it was removed with the placenta; and then, because the soft and torn uterus offered some danger for the patient, it was also removed, with the remaining ovary. The patient was discharged well in fourteen days. The error in diagnosis was due to the adhesion of the tumor to the abdominal wall and the fluctuation of the accompanying hydramnion. Auscultation had been omitted, but would have been useless anyway, in a pregnancy of four months with hydramnion.

Loviot⁷²⁸_{Sept. 25, '94} examined, with the patient's consent, a wet-nurse suspected of being pregnant. He recognized a three months' pregnancy. A few months later he heard that his patient did not believe she was pregnant, and that she had been admitted into a hospital, where an operation was performed. A live infant was discovered. On making inquiries, Loviot found that abdominal section had really been undertaken. The surgeon and also the obstetrician of the hospital gave evidence as to the patient's statement that in her capacity of wet-nurse she had not menstruated and could not be pregnant. Relying readily on the patient's assertions, an operation was performed with the result above stated.

Protracted Pregnancy and Premature Birth.

A. Stahl,⁹_{July 9, '96} reported the case of a German Bohemian woman in whom the fifth pregnancy terminated three hundred and two days after the last menstruation. Twenty days before there had occurred pains similar to those of labor, but they gradually ceased. The sacral promontory was exaggerated and the antero-posterior pelvic diameter of the inlet diminished in consequence. The foetus was large and occupied the first position. Version was effected with difficulty, and the passage of the after-coming head through the superior strait required expression and traction, during which the child died. The mother suffered a deep laceration of the perineum, involving an inch of the wall of the rectum.

Villemin⁶⁷³_{Mar., '96} reported the case of a child, 2 years old, which was born in the sixth month of pregnancy. The fact that the child had not had more than six months of intra-uterine life was

proven in many ways,—the last menstrual period of the mother, a multipara; the date of the first foetal movement, the weight of the child (950 grammes—30½ ounces), and its appearance. Budin had had the infant under observation from the beginning and stated that the dates were exact. He did not think the child could be raised. He had examined infants of six or seven months that had cried and had lived a few days, and had found the alveolar cavities filled with epithelial cells, the lung sinking to the bottom when placed in a vessel filled with water. The case is interesting from a medico-legal stand-point, as, according to law, the child not being of six months, it would not be necessary to declare its birth.

Charpentier had had a case of premature birth in his practice, the child not being certainly more than six and a half months, and weighing 1040 grammes (33½ ounces). He was so certain that it would not live that he put it in a basin while he gave his attention to the mother. Having attended to her needs, and the child being still living, he wrapped it in cotton, and was surprised next day to find it alive. He then had it put in a small, well-heated room, and had it fed with a spoon on woman's milk; on the twelfth day it could take the breast, and it has since thrived and grown.

Tumors and Pregnancy.

Fibroma.—Hofmeier¹¹⁹ denies that fibroid disease of the uterus has any direct influence in causing sterility. Subserous myomata do not predispose very strongly to sterility, as proven by statistics, while polypi and cervical myomata have little influence in that direction. These tumors seldom appear till late in sexual life; so that if the patient be barren or a multipara, the causes of her sterility or fecundity must have influenced her long before the development of the tumor. He claims that the alleged frequency of this disease in elderly virgins is based on a fallacy. It is the local affection which brings most readily a spinster to the gynaecologist, while middle-aged married women trouble less about small and slowly-growing abdominal tumors. Women with fibroids, who marry late in sexual life, are fairly fertile. Fibroids, he says, do not strongly predispose to abortion, nor do the tumors greatly interfere with the uterine contractions during labor. The best time for hysterectomy is a few weeks or months after delivery.

[I have often observed cases of pregnancy among women afflicted with fibroma, and, if the mechanical difficulties which these tumors offer during the development and expulsion of the foetus are excepted, I consider that fecundation itself is never hindered by their presence. In fact, without affirming that fibro-

mata are propitious to fecundation, I believe that they contribute to prolong the activity of uterine life beyond the normal period. As a result, fibromata are more likely to promote fertility than to cause sterility.—A. L.]

Rémy, of Paris, ¹⁹_{July 12, '96} reports a case of a woman, with a large fibroid tumor, who became pregnant twice. There were two distinct tumors in the abdomen,—one on the right side and one on the left,—which at full term were about of equal size. At the first labor the foetus was dead, but in the second a living child was born and the mother made an uninterrupted recovery.

Hofmeier ³⁹³_{May, '96} states that myofibromata complicating pregnancy do not involve any particular danger for the patient, either from hæmorrhage or interruption of gestation; in fact, the dangers of such a pregnancy are no greater than those of a normal one. In some cases there is a rapid hypertrophy of muscle-fibre of the uterus; but this quickly recedes after confinement and should not constitute a danger to the patient.

Rosenberg ²⁷_{May, '96} reports four cases of pregnancy complicated by fibroid tumors of the uterus. The tumors varied in size, in different cases, from an orange to a foetal head. The plan of procedure was to allow pregnancy to progress without any interruption, unless indications should arise for some action. No need for this arose, and each case was successfully delivered and passed through a quite normal puerperium. The only complication that presented itself was adherent placenta with post-partum hæmorrhage in two cases. The tumors decreased rapidly after delivery in each case, and Rosenberg contends, in view of this experience, that myomectomy, which is a dangerous operation, should never be performed during pregnancy unless some exigency arises. Such cases, he thinks, will be very few. Most cases requiring operation can be allowed to go on till labor begins, and if delivery *per vias naturales* is impossible, then, and only then, has the time arrived to interfere and to perform Cæsarian section or the Porro operation. Both of these operations give far better results than myomectomy during pregnancy, especially if timely preparations have been made. Finally, he thinks that too many such operations are being performed for insignificant indications, and that fibroids, except when they are very large, do not give rise, during pregnancy, to so many alarming complications as we have been led to believe.

Léopold ²⁷_{May, '96} describes the case of a pregnant multigravida who had a hard, round tumor on the left side, above the pubis. On making an abdominal incision a calcified myoma in the anterior uterine wall was found, freely movable, extending deeply into the

muscular layers of the uterus. The capsule was incised transversely, the tumor removed, and its bed tamponed with iodoform gauze. The bed of the tumor was obliterated by twenty-six deep and superficial catgut sutures. The peritoneal flaps were shortened and united by fine sutures. The patient made a perfect convalescence and went to term, being delivered spontaneously.

Malignant Growths.—Hernandez²⁷_{May, '96} sums up an article upon this subject, illustrated by many cases, with the following conclusions: 1. Whenever the fact is recognized that a pregnant woman is affected with cancer of the uterus, if this cancer can be operated upon at all, the uterus and appendages should be removed at once, no matter what the date of the pregnancy may be. 2. The operator should take all precautions necessary to prevent infection of the womb by the cancerous products and to remove the whole of the neoplasm. 3. With these objects in view, he should adopt such operative procedures only as will enable him to entirely remove the uterus and its appendages, after having isolated the neoplasm with a few sutures. In the first three months vaginal hysterectomy is the operation to be preferred, and should be performed according to Martin's method; after that time, total abdominal hysterectomy according to Mackinrodt's method should be performed. If the pregnancy has not gone beyond seven and a half months, even though the child be alive, the uterus should be removed; if the foetus is decidedly viable, or if term has been reached, Cæsarian section should be resorted to, followed by extirpation of uterus and appendages. 4. If the cancer is beyond operation all energy should be devoted to saving the child. 5. An early diagnosis alone can give hope of definite cure; it is, therefore, advisable, in every case of pregnancy, to look for uterine cancer. 6. The measures recommended all have for their object not only a prolongation of life, but, wherever possible, a radical cure. It is to be desired that in every case careful note should be made of the condition of the patient, the extent of the neoplasm at the time of intervention, the date of pregnancy, and the time which has elapsed between a recognition of the cancerous condition and the operation; whether cancerous masses have been removed and the neoplasm, as far as possible, isolated by means of sutures; whether the whole cancer has been removed with the uterus and appendages, and by what method.

C. Ruge²¹⁶⁷_{Jan. 14, '96} describes the views held on deciduoma malignum before the recent work of Marchand. The definition of this affection implied a direct connection between the characteristic clinical course and childbed or abortion, the early symptoms resembling those of a retained placenta. Histologically the matrix

was thought to be formed by the decidua, though, according to Gottschalk, the same clinical phenomenon might depend on disease starting in the chorionic villi (chorio-deciduoma maligna). The omission of direct connection with pregnancy from the definition might justify Veit's objection that the affection was a primary sarcoma or carcinoma with no direct—certainly with no histological—connection with pregnancy.

On the basis of the definition, Ruge thinks some of the reported cases not established as true deciduoma malignum, and that others, described as deciduo-cellular sarcoma, had been considered as allied to this affection merely because the elements were large, closely resembling the cells of the decidua. The term "deciduo-cellular" is purely descriptive. Similarity does not imply genesis, and resemblance is no proof of origin. In deciduoma malignum the decidua was supposed to be the matrix. The characteristic clinical course is of much more importance than the accidentally large size of the cell-elements.

In the author's opinion an innocent increase in the number of the cells of the decidua (polypoid excrescences) may occur during pregnancy, but malignant proliferation hardly ever does so, and certainly not with the frequency of the reported cases of deciduoma malignum. Malignant degeneration generally manifests itself in the stroma-cells of the uterine mucosa, being affected before pregnancy (Veit) or perishing so soon after its termination that none of them are to be found. From all we know of the decidua the occurrence of malignant degeneration of its cells is most improbable, and proof of it almost impossible. The decidua-cells found after some abortions, in the neighborhood of accidentally retained villi, do not exhibit any exuberant growth.

In regard to Gottschalk's sarcoma of the chorionic villi, neither description or drawing admit the idea of its being a sarcomatous degeneration nor show the transition stages from normal state to degeneration that Säger was justified in demanding.

Placental Hydatids.—A. Bethune, of Seaforth,⁵⁹ related the history of a woman whose first labor was normal. Her second pregnancy had advanced to the sixth month when flowing began,—a discharge of water, mucus, and blood. About three weeks afterward labor came on. The uterus was almost entirely filled with a spongy, friable placenta, which was removed piecemeal, several of the pores containing hydatids. The foetus was dead and crushed flat. The woman made a good recovery.

Ovarian Tumor.—Macpherson¹¹⁷⁰ reported the case of a patient who consulted him when about seven weeks pregnant and in whom a solid tumor, probably ovarian, was diagnosed and im-

mediate operation recommended. For reasons of her own the patient returned home and only came back for operation when pregnancy had advanced to the sixth month. The abdomen was consequently considerably enlarged, and the ovarian tumor raised above the pelvis, increased in size, and solid and firm in consistence.

In view of possible malignancy of the growth, an operation for removal was decided on. From the size of the uterus, the usual mesial incision would not have given sufficient control of the pedicle, and removal might have been difficult. The abdomen was, consequently, opened by a longitudinal incision to the outer side of the left rectus muscle, immediately over the site of the growth, and through this the tumor was readily turned out and the pedicle secured. The wound was closed by buried sutures, uniting peritoneum, muscular wall, and fascial covering separately, a continuous horse-hair suture closing the skin. Recovery was uninterrupted and pregnancy in no way interfered with. The tumor itself was of a very unusual nature, consisting of a base of strong, calcareous matter, overlaid by a mass of soft, glandular-like tissue.

Cardiac Diseases Complicating Pregnancy.

George Sears ⁸¹⁴_{Apr. 18, '90} expresses the opinion that cardiac lesions as a complication of pregnancy have not received sufficient attention in the text-books, when their importance is considered. Cases in which the cardiac symptoms are slight, as a rule, have a favorable issue, but if the cardiac symptoms are marked, and have a tendency to increase, it is questionable how far the expectant treatment is justifiable. Thirty-five or forty per cent. of cases with serious complications are fatal. The prolonged strain of labor upon the weakened cardiac muscle is not only dangerous at the time, but permanently injures that organ so that it does not regain its previous strength. We thus have two dangers to consider,—the present and the remote; while in eclampsia or in pernicious vomiting we have but one,—the immediate. Why should not the treatment of emptying the uterus before the condition becomes desperate be equally justifiable in cardiac lesions as in eclampsia or vomiting? The author quotes several writers on this subject as follows: Ssolowjew says that when ordinary methods fail, labor should be induced, even in desperate cases. E. Leyden says the results are so bad because it is postponed till too late. Allyn, in speaking of mitral stenosis as a complication, says that the frequent occurrence of spontaneous miscarriage or premature labor is an indication that it should be induced when dangerous pul-

monary symptoms persist in spite of treatment. It is conceded that the expectation of life in children born of women with serious heart-lesions is much impaired; so that too much consideration for the life of the child, without benefit to either, probably has been given.

The histories of seven cases are given. The seven women were collectively pregnant thirty-one times. Of the 15 children born before the cardiac symptoms became so severe as to require advice, 12 are alive and 3 are dead. In the 16 other pregnancies, in which the cardiac symptoms were marked, all but 3 are dead and 1 of the 3 surviving has but a few months to live.

Mitral Stenosis.—Herman B. Allyn ²¹³_{Oct., '96} has studied the influence of pregnancy on 62 women who were the subjects of mitral stenosis. Of the 62 patients 23 died, either in the course of pregnancy, in parturition, or within three weeks after delivery. The most fatal period for such women is just after delivery; 14 of the 23 died between sixteen and twenty-two days after the birth of the child, 2 died in labor, and 7 before parturition set in. Abortion or premature labor was not infrequent; so that the risk under such circumstances is not only to the mother. The pulmonary symptoms of mitral stenosis are specially prominent in pregnancy—dyspnœa, bronchial catarrh, and pulmonary œdema. These may give trouble before the fourth month of pregnancy, but do not, as a rule, become serious until after the sixth month. Hæmorrhages from the lungs and uterus are pretty common, but are to be regarded in a favorable light, for they occurred in only 8 of the 23 fatal cases, whereas they happened in 18 of the cases that ran a favorable course. Anasarca, albuminuria, and convulsions are not constant.

Marriage, therefore, and still more pregnancy are undesirable for women with heart disease. If pregnancy has occurred and symptoms of cardiac disablement set in, the patient must be enjoined to rest as much as possible and to avoid all excitement. The practitioner must not be too anxious to suppress hæmorrhages after confinement, and ought to avoid ergotine altogether.

During labor chloroform should be given when the pains are too severe, and also in the later stages, to arrest the voluntary efforts of the patient to expedite delivery. In view of the special danger to which such patients are exposed for some time after delivery, the need of prolonged rest in bed is obvious.

Abortion.

E. J. Hill ²³_{Mar., '96} states that in many cases our interference becomes necessary because we deal with conditions which favor

a retention of secundines,—as, for instance, a broken ovum; a displaced, a septic, or otherwise diseased uterus. When we can foresee the probability of a retention we must use such efforts as will further its expulsion, provided it can be done by such means as will not produce injury to the mother. The author considers that in a majority of cases a clean finger is the best instrument. If, however, the whole ovum and decidua have not come away, the forceps and the sharp curette find their places, the latter for thorough removal of the uterine decidua.

A temperature of 101° F. (38.3° C.) or above is always a distinct indication for an immediate cleansing out of the uterus. The vulva, vagina, cervix, instruments, and hands should be made thoroughly aseptic before an operation is permitted. In septic cases large, hot, antiseptic, intra-uterine injections should follow the cleansing out of the uterus, and the uterus should be drained by gauze. Hill has never seen any good come from ergot given previous to emptying the uterus.

Noble, of Philadelphia, ¹⁰⁷_{Am. J.} thinks that in most cases, when infection has not yet taken place, the curette is not useful for removing the ovum, the finger being quite sufficient.

If, however, infection has taken place, it is unquestionably better to thoroughly remove not only the foetal parts of the ovum, but the maternal decidua as well. In the natural course this is thrown off as detritus, and its removal with the curette is simply hastening the result obtained by nature's process. A further advantage is obtained by removing a large number of the contained germs, and at the same time the culture-medium in which they are developing. The employment of a very large cutting curette is advisable, as this will quickly remove the decidua and be less apt to perforate the uterus than a narrow curette. The author recognizes that the danger of puncturing the uterus is by no means imaginary. It has been done many times by skillful men, and therefore the risk of this accident in the hands of the inexperienced is very considerable.

The curette should be employed for the removal of the decidua only after first removing all portions of the ovum in which infection has occurred. It is most important to thoroughly douche out the uterus, and to introduce iodoform in suppository and iodoform gauze after the completion of the curetting.

The practice, which is now only too prevalent, of failing to make use of rigid antiseptic measures, permitting the process of abortion to drag on for days, and at times even weeks, is considered by the author as responsible for most of the deaths which now occur from abortion, and also for one-third of the operations

which are now performed for the removal of the uterine appendages for inflammatory conditions.

[I have expressed the same opinion in a paper ²⁴_{Sept. 29, '96} in which several cases of abortion are reported. When the expulsion of ovum or of the after-birth is not complete, it should also be removed, even when there is no infection. I can see no objection, however, to the use of a soft curette when the wound cannot be dilated and the finger easily introduced. The curette greatly facilitates the removal of the ovum principally when it has been partially expelled.—A. L.]

Audebert and Chaley, of Bordeaux, ⁹⁹⁶_{Sept. 28, '96} reported thirty-five cases of curettage after abortion in which the finger or the curette was used. The authors do not advise the use of forceps or of dilating instruments.

Matthew D. Mann ¹⁹_{July 18, '96} published three cases of perforation of the uterus after abortion with prolapse of intestine. In one case a woman perforated her uterus by introduction of a catheter with its stylet. The physician to whom she applied for treatment did not recognize the condition until in curetting the uterus he found torn intestine in it. An abdominal section was performed by the author, and he found it necessary to ligate the mesentery in several places and to use a Murphy button to reunite the colon and ileum. The patient recovered. The other cases were ruptured by surgeons using dilators in the treatment of abortion. One operator, finding that he had ruptured the uterus and that there was prolapse of intestine, tried to get competent assistance and, failing, performed abdominal section. The patient died of sepsis. The other man, finding the same condition, lost his head and, after pulling out six feet of intestine, cut it off, in the belief that it was the funis. This woman, of course, died. This occurrence does not seem so rare as might be supposed; the uterus after an abortion is particularly liable to rupture by forcible dilatation or by rough curetting. When rupture occurs a well-conducted cœliotomy will usually be successful, and there is no need of great haste in performing it unless the hæmorrhage is severe.

George Edebohls ²²_{Aug. 14, '96} records a case in which he had occasion to perform curetting in a double uterus. The right half was elongated in form, resembling the normal single uterus in shape, and measured twelve and one-half centimetres from external os to fundus. The left half was more globular, measured eleven and one-half centimetres from os exterum to fundus, and evidently had contained the foetus. Its cavity was everywhere lined with placental remains, which extended across the ridge for a small

distance into the right cavity. Both halves of the uterus were curetted, washed with 1 to 2000 sublimate solution, and each half drained with its own strip of gauze, leading together out of the common cervix. Patient made an uneventful convalescence.

Edward Ayers, of Brooklyn, ⁵⁹_{Sept. 28, '96} states that as a general proposition it may be said that whenever an abortion takes place none of the tissues that are present only in pregnancy should be left in the uterus. The uterus certainly objects to foetus, amnion, and chorion, once the ovum dies, and it cannot use the decidua either in repair or in forming new endometrium. It must be removed before a healthy state can be inaugurated. It cannot be said that we should always interfere and remove these tissues, for, though nature may be inefficient, there is room for much bungling on our part. The author argues that our individual judgments in given cases must decide. At four weeks' abortion we should, as a rule, keep down hæmorrhage and wait for nature to act. If called upon to interfere, it will be the decidua that we must needs remove. The curette, and not the finger, should be used.

At six and eight weeks the chorion will cause the most trouble. Either finger or curette might be indicated in cleansing the uterus. A strip of iodoform gauze should be introduced to the fundus to prevent secondary hæmorrhage, render a foul cavity pure, to stimulate repair, and favor drainage.

At ten and twelve weeks the foetus comes out first, and the other tissues are apt to need artificial removal. The finger is to be preferred to any instrument. Gauze should be used at these times. Small, repeated doses of ergot are desirable for twenty-four hours.

In cystic degeneration of the chorion the cervix should be dilated with a Barnes bag, and the contents scraped out with the finger or hand. Gauze should be introduced immediately and left twenty-four hours. Ergot is needed. In uterine mole the uterus should be left alone, barring the need of checking hæmorrhage. A mole is a very solid body and comes away whole, leaving the cavity clean.

Diseases Complicating Pregnancy.

Renal Disease During Pregnancy.—P. Silex, ⁴_{Nov. 1, '96} in discussing the prognosis of this affection, gives a sketch of the usual appearances met with in ophthalmoscopical examination. Usually the retina is dull and opaque, the papillary margins irregular, and the papillæ themselves frequently swollen. The veins are dilated and tortuous and the arteries contracted, showing distinct, whitish borders. Clinically, the disturbance of sight comes on

slowly in the course of weeks and months, mostly in primiparæ, and in the second half of pregnancy, as the albuminuria—apart from some few cases, where it shows itself in the first few weeks—generally occurs at this time. The vision becomes less without contraction of the field or alteration of the color-sense; sometimes, especially if eclampsia come on, sight entirely goes, to return gradually if the pregnancy is terminated or even if it continue. Once the affection occurs, relapses are readily seen in later pregnancies, by which the prognosis each time becomes more grave. Of all the forms of albuminuric retinitis the best prognosis is that of the form due to the “pregnancy kidney.” Vision may return to the normal, but, according to Silex, this is only to be obtained if, on the establishment of the affection, the pregnancy is terminated either naturally or artificially. The disturbance of vision in this form is caused less through the changes one can discern in the retina than by the complications which set in,—*e.g.*, atrophy of the optic nerve, of the retina and choroid, and in retinal detachment. Silex believes that, even with moderate impairment of sight, the induction of labor should be considered. With regard to prognosis from ophthalmoscopical appearances, those cases which show no alteration in the blood-vessels, and particularly where no change in the vessel-reflex exists, are the most favorable. If, on the other hand, the changes in the reflex are distinctly visible, or the vessels show the well-known hyaline transformation in the walls, then atrophy of the retina is to be feared, as well as an ascending atrophy of the optic nerve.

Fratenroth² on 12, 74 finds that, in about half the cases of pregnancy in healthy women, primiparæ or otherwise, a trifling amount of albuminuria is to be detected in the second half of pregnancy. In a minority of cases this symptom is not due to renal changes; in the majority it represents a special morbid condition, best termed “the kidney of pregnancy.” As a rule, this condition involves no symptoms. Eclampsia and oedema are rare. The pregnancy kidney never changes into the kidney of any chronic form of nephritis. There is no true nephritis of pregnancy. Albuminuria is the rule during labor, especially in primiparæ, and casts (usually hyaline) are to be found in almost a third of the cases. In the albuminuria of pregnancy casts are much rarer. The albuminuria of labor is most marked during the period of dilatation, and disappears rapidly during childbed, except when there is fever. Later on, toward the second week, albuminuria usually indicates catarrh of the lower part of the urinary tract. The albuminuria of pregnancy and labor does not render chloroform dangerous. Renal

disease existing before pregnancy is greatly aggravated by that condition, often ending in death of the ovum and abortion, after which the disease abates more or less. The causes of pregnancy kidney are the increase of intra-abdominal pressure, changes in the nutrition of the kidney brought about by the altered condition of the blood and, in special cases, obstruction of the left ovarian vein, which joins the left renal, and compression of the ureter by the foetal head. The last two causes apply to the kidney of labor, where also septic changes from pieces of foetal appendages play a part. The degree of the changes which make up the kidney of pregnancy depends on the resisting power of that organ in the individual patient.

Gossmann ³⁴_{No. 24, '96} does not find that nephritis necessarily ends in chronic nephritis. He saw it recur in one patient during eight pregnancies, but she is still free from kidney symptoms when not pregnant. He finds that induction of labor by means of vaginal douches is perfectly simple, and in two cases this means alone proved sufficient. In one of them the child was saved and reared.

Nervous Disorders During Pregnancy.—Jagodenski ⁵⁸⁶_{No. 22, '96} has examined the brains of eight cases of eclampsia occurring during pregnancy and reached the following conclusions: 1. In eclampsia there is diffuse inflammation of the brain. 2. In the nerve-cells is seen white, cloudy, fatty, and vascular degeneration of the protoplasm and nuclei of the nerve-cells. 3. The greatest changes in the nerve-cells are found in the motor areas. 4. The destructive changes in the nerve-cells are not in any greater or less degree according to position relatively to the vessels. 5. Sections of the cortex and the ganglia everywhere showed hæmorrhagic spots of necrosis in the brain-tissue. 6. The presence of hæmorrhagic necrosis of the brain-tissue is always associated with extravasations of blood. 7. In addition to hæmorrhagic foci of necrosis there is always non-hæmorrhagic necrosis, especially in the cortex of the brain. 8. In the necrotic patches bead-like swellings are seen of the myelin-cylinder of the nerve-fibres, and this breaking up into myelin-granules. 9. In eclampsia, both in the cortex and the ganglia, there is an extraordinary number of neuroglia-cells. 10. The proliferation of the cells of the neuroglia has an acute character. 11. In many places it is possible to demonstrate compression of the nerve-cells by the multiplication of the cells of the neuroglia. 12. This compression often ends in complete atrophy of the nerve-cells and their subsequent replacement by neuroglia-cells. 13. There is a well-marked exudation of uninuclear leucocytes from the vessels of the brain-substance. 14. Colored and uncolored

blood-cells occupy the cavities of the nerve-cells and leucocytes invade the protoplasm of the cells. 15. In the veins of the brain thrombi are found in the sinuses very exceptionally. 16. The swelling of the nuclei of the ciliated endothelium and of the small vessels and the compression of the latter by the crowding of the proliferating neuroglia-cells obstruct the circulation of the blood. 17. The clinical picture of eclampsia—convulsions, loss of consciousness, etc.—is explained by the pathologico-anatomical changes of the cerebral tissue.

Rabczewsky⁵⁶⁹_{P. 2, '96} has come across an instance of convulsions during pregnancy in which every fit was regularly preceded by a transitory amaurosis as well as by œdema of the face, which was also of short duration. Two sets of convulsions occurred during one pregnancy,—the first about the end of the seventh month, four attacks taking place within twenty-four hours; the second in the course of the eighth month, when two fits were observed. After the last convulsion a healthy child was delivered. The mother recovered perfectly. The two prominent symptoms above mentioned developed before each of the six fits, which took place at two epochs of pregnancy. Olshausen has been able to collect only three cases of eclampsia in which the fit was preceded, as in Rabczewsky's patient, by an aura.

Use of Drugs During Pregnancy.—Coromilas, of Calamata, Greece, ³⁸_{Aug. '96} states that, although in some cases quinine administered to pregnant women appears to have little oxytocic action, in others it has the power of exciting uterine contractions, more particularly in delicate, nervous, and anæmic women. He has also observed that quinine administered during menstruation in some cases stops the flow, and frequently diminishes it. He relates the history of four cases in which quinine apparently induced labor-pains, and thinks that during pregnancy and menstruation quinine should not be given in large doses unless it be in conjunction with some narcotic that will act as a sedative upon the uterus.

Huguenin⁶¹_{May 11, '96} mentions, as chief of the remedies which are dangerous to the pregnant woman, salicylate of sodium and ergot. Purgatives—castor-oil, mineral salts, and especially aloes—should be avoided. Oxalic acid and its salts—oxalate of potash, etc.—may prove dangerous. Antipyrin frequently taken inhibits the lacteal secretion; cocaine locally applied for fissured nipples has the same effect and should be proscribed for nursing women. As to operative measures, they are not absolutely contra-indicated; we may, for example, extirpate a periuterine tumor, the development of which hinders pregnancy, provided the operation is speedy and little blood lost. It is better to wait until the fourth or sixth

month before operating. Operations in the vagina or uterus, no matter how minor, should be avoided in order to avoid suspicions of abortion in the patient's mind.

Referring to a former article by Finz, ^{July 11, '91} upon "white infarction" of the placenta as a cause of foetal death, and of the opinions of W. L. Reid, of Glasgow, relative to the frequent occurrence of this condition in mothers evidencing a decidedly rheumatic history, an anonymous writer ^{Apr. 30, '96} relates a case in which the first parturition had terminated in the birth of a still-born and perfectly well nourished male child, which had apparently been dead for several days, doubtless due to disease of the placental structures. The parents of the patient having both died from diseases incidental to the cardiac infections following acute rheumatism, and she herself being subject to subacute attacks of it, he examined the urine periodically and found a constantly high specific gravity (1030 to 1036) and great excess of uric acid. The plan proposed included the continuous exhibition of salicylate of sodium, salicylate of quinine, or salol p. r. n., with labor to be artificially induced soon after the termination of the eighth month. Upon the occurrence of pregnancy the patient progressed normally, seldom a week going by without daily doses of the remedies being administered. The urine maintained a specific gravity of 1020 or lower, with greatly lessened acidity, and the general condition after the early distress of nausea was as good as could be expected. Labor was induced (by the introduction of a bougie) on the date and day proposed six months before, and was terminated naturally by the birth of a living and perfectly nourished female child, which weighed over 7 pounds. The placenta was not markedly abnormal, though there might be a suspicion of degeneration commencing on the maternal surface opposite the insertion of the funis, and at points upon its extreme margin. The patient had a perfectly healthy convalescence, and nursed her child adequately. The infant at 8 months weighed about 16 pounds.

Titone, of Palermo, ^{Mar. 22, '96} in view of the well-known ecboic action of quinine, was led to try phenocoll in pregnant women suffering from malaria. The results were such as to satisfy him that, while the drug is efficient as a remedy for malaria, it has no action on the uterus. He gave it in doses of $1\frac{1}{2}$ grammes ($22\frac{1}{2}$ grains), divided in four cachets, to be taken according to the Roman method,—that is to say, five, four, three, and two hours before a febrile paroxysm is due. The drug was given in this way till the attacks ceased, and in all the cases pregnancy went on to term without any of the uterine contractions, foetal move-

ments, or slight hæmorrhages due to partial detachment of the placenta such as are observed when quinine is administered to pregnant women. The author gives details of four illustrative cases, but he has used the drug in many more with equally beneficial results.

Kalt ³¹_{Mar. 17, '96} has been studying the action of *thuja occidentalis* upon pregnant women and its properties in producing abortion. The drug was used by a pregnant woman in view of producing the abortion at five months, a strong infusion being taken. The immediate effects were violent colics, diarrhœa, cystitis, anuria, eclampsia, and coma. The expulsion of a dead fœtus took place three days after the ingestion of the drug. The patient then had nephritis, but finally recovered. Kalt thinks that *thuja* contains an active principle similar to the one contained in *sabina*.

OBSTETRICS, PUERPERAL DISEASES, AND DISEASES OF THE MAMMARY GLAND.

BY THE CENTRAL EDITORIAL STAFF.

SUBMITTED FOR COMMENTATION TO

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NEW YORK.

OBSTETRICS.

Asepsis in Midwifery.

Leopold ⁹⁵_{R. G. H. J.} emphasizes the view that, although in dystocia or operative labors vaginal and even uterine injections are necessary to prevent complications, in normal labors in healthy women such procedures are more hurtful than useful, and often have no other effect than to cause acceleration of the pulse and elevation of the temperature.

Hans Meyer, ²¹⁴_{May 1, '96} in referring to asepsis in parturition, quotes the following figures, contributed by Robert Boxall, who collected the statistics of mortality among women during the first week after labor, in England, from 1847 to 1892. In 10,000 confinements the proportion of deaths from septic disorders was as follows:—

	FROM 1847 TO 1892.			FROM 1847 TO 1880.			FROM 1880 TO 1892.		
	Puerperal Fever.	Hæmorrhage, Eclampsia, etc.	Total.	Puerperal Fever.	Hæmorrhage, Eclampsia, etc.	Total.	Puerperal Fever.	Hæmorrhage, Eclampsia, etc.	Total.
England and Wales	19.5	29.0	48.5	16.7	34.6	51.3	24.9	22.1	47.0
London	21.3	24.2	45.5	24.1	30.6	54.7	21.5	15.9	37.4
Provinces	19.4	29.8	48.7	15.8	34.2	50.0	25.6	23.8	48.9

It is thus shown that the total mortality of lying-in women was but little lowered during the first seven years, except in London. On the other hand, the deaths from puerperal fever, taken all in all, have been more numerous since 1880; for,

though they have slightly diminished in London, they have considerably increased in the rest of England. The mortality due to complications, such as hæmorrhage, eclampsia, etc., is reduced by one-half in London and one-third in the counties.

Sébileau, ²¹²_{July 10, '96} in commenting upon vaginal injections after parturition, concludes that in the majority of instances they are useless, the vagina being in reality an aseptic region through the fact that it does not contain any pathogenic micro-organisms. Even admitting the theory of auto-infection advanced by certain authors, the antiseptics minutely carried out during the time of labor should have freed the vagina from the microbes which it may have contained; consequently, the washing of the external genital organs several times a day with antiseptic solutions and the antiseptic dressings applied to the vulva in the internal should suffice to prevent all danger of infection during normal involution.

Wright, of Toronto, ¹⁷⁰_{May, '96} in referring to vaginal douching during the puerperium, contends that douching disturbs that perfect rest and quiet which are so desirable for a patient after labor, and that it is unscientific on surgical grounds. After labor the utero-vaginal canal is bruised and wounded; pressure, position, and drainage are therefore indicated. Douching does not lessen the dangers accruing from the presence of bacteria in the vagina, although this is most difficult to prove definitely. It is generally agreed, however, that in normal cases the vaginal mucus is strongly acid and is destructive to pathogenic cocci. Vaginal antiseptic injections may, therefore, interfere with this normal acidity, and thus chemically lessen the resistance of the tissues to bacteria. Furthermore, douching is actually dangerous. It is apt to disturb clots and thus open avenues for infection; to open lacerations of the cervix and vagina and thus prevent them from healing; to wash bacteria into the uterine cavity and thus cause septic metritis.

Wyder, of Zurich, ²¹⁴_{Mar. 15, '96} states that at the obstetrical clinic of Zurich the mortality through puerperal infection is only 1 per 1000. Except in the cases in which it was necessary to manipulate the uterus he has entirely renounced ante- and post-partum irrigations. When intra-uterine injections seem to be indicated he uses lysol and, above all, sterilized hot water.

A. Y. Reid ⁵⁷³_{Dec., '96} compares the methods practiced in city institutions of New York with those in the private practice of four physicians. The institutions included the Sloane Maternity, the City Maternity on Blackwell's Island, and the Lying-in Hospital for the Instruction of Medical Students at Seventeenth Street and Second Avenue. The chief differences in the methods of aseptic and antiseptic practice in the institutions and in the hands

of the private practitioner were the omission by the latter of the vaginal douche before and after labor and the impracticability of shaving the pubes as was done in hospitals.

R. A. Murray calls attention to the fact that the worst cases of midwifery usually occurred in maternity hospitals; yet these now give a smaller mortality-rate than is seen in private practice. The reason is that in private practice physicians do not do what they ought to secure asepsis. When the physician keeps himself and his hands clean sepsis does not occur, no matter what the surroundings of the patient may be. The nurse should not examine the patient.

When injections are to be used, Tarnier ^{Mar. 30, '96} prefers iodine-water, which possesses the property of penetrating some distance into the thickness of the tissues. He considers sublimate lotion too dangerous for use within the uterus, unless followed by an intra-uterine injection of some inert fluid, which, of course, weakens its antiseptic action. Sublimate lotion for the hands, carbolic lotion for the instruments, and iodine-water for the uterus appear to be the present combination preferred by him for actual practice.

[Alcohol 95 per cent. for the hands, sterile water for instruments, and creolin or lysol for irrigation are preferable.—E. H. G.]

Presentation.

Face Presentation.—Roberto Muggia ⁹⁴³ ^{Sept., Oct., '96} ³⁸ ^{Feb., '96} states that these presentations occur once in 137 cases (41 in 5644 labors). Of 41 instances met with by him, in 25 the chin of the child was to the back and right side, in 2 it was to the front and left, in 2 to the back and left, in 2 to the front and right, and in 5 it lay transversely and to the left. Among the foetal causes for the presentation found by Muggia were foetal struma, coiling of the cord around the neck, dolicocephaly, absence of the cranial vault, small size of the foetus, oblique position of the foetus, maceration, increase in the biparietal diameter, abnormal size of the head, abnormal shortness of the neck, and the female sex. The maternal causes included repeated pregnancy, hydramnios, uterine obliquity, uterine tumors, low implantation of the placenta, and pelvic contraction. In addition to the causes given in this list the author adds those that have been advanced by other writers, but which he has been unable to confirm. It would seem that the foetal causes are the more important, and heredity may even come into play. A practical conclusion is that, if a face case evidently represent the expression of given anatomical conditions, maternal and foetal, the intervention of the obstetrician is, in the great

majority of cases, unnecessary. The genu-pectoral position of the patient in labor is advisable in order to aid the rotation of the chin. All external and internal manual interference should be undertaken only in definitely ascertained cases and under certain circumstances, for the foetus which presents by the face will often come safer thus into the world than if its presentation is modified. In only one of the author's cases was an asphyxiated infant not resuscitated. Of course, it would be absurd to say that a face case is more favorable than a vertex; at the same time, in the circumstances, presentation by the face may be a natural way of escape.

J. F. Baldwin²⁷_{Nov., '96} also states that mento-anterior positions, previously looked upon with dread, are now known to be practically devoid of danger to both mother and child, and present slight obstacles, except a somewhat tedious delivery, and, if too long delayed, forceps can be used, if deemed advisable.

Thorn³⁹³_{Vol. 31, No. 1, '94} believes that, when a face presentation develops at the end of the first or second period of labor, delay is dangerous, in the interests of the child. The first effort of the obstetrician, he thinks, should be to change the presentation into an occipital one by combined manipulation under anæsthesia. For the success of this manœuvre it is requisite that the foetus be movable in the pelvis and that the mouth of the womb be sufficiently open to permit the introduction of at least half a hand. The combined method is contra-indicated when the face presentation was present from the beginning and did not develop through abnormality in the mechanism of labor; it is also contra-indicated in prolapse of the umbilical cord or of the foetal extremities in placenta prævia* and low attachment of the placenta, where the lower uterine segment is greatly distended, and where disproportion between the foetus and pelvis exists.

Breech Presentation.—Pinard⁷⁷_{Jan., '96} asserts that when, in a woman who has passed the sixth month of pregnancy, a sharp pain is produced by placing the hand on the fundus uteri, it may be almost affirmed that there is a breech presentation. The fact is very frequent, although not constant, being present in about 70 per cent. of cases. The pain is sometimes spontaneous, and, if version is performed, it disappears. Pinard claims that the pain is due to the irregular distension produced by the head.

Bar²³⁶_{Mar., '96} exhibited, at the February meeting of the Paris Obstetrical and Gynæcological Society, an infant, aged 2 years, with a deep scar on the right groin. It limped slightly, and the right thigh was four-fifths inch short. Bar attributed the shortening to atrophy of the head of the femur following separation of

the epiphysis due to the fillet. He exhibited a similar case where he had used the fillet. A deep, incised wound lay in the left groin. A crack was heard during the extraction. The wound suppurated and the child died of pneumonia. Charpentier admitted that he had damaged both soft parts and bones, even when employing the fillet with the greatest care. Guéniot always aided the traction of the instrument by passing the hollow of the hand into the concavity of the sacrum and exercising further traction. This provoked uterine efforts. Budin added uterine expression as an aid to the fillet. Porak believed in the application of two fillets, one on each thigh. Maygrier held that the fillet should be used in dorso-anterior and the forceps in dorso-posterior positions. By that principle fractures are avoided. Olivier protected the fillet by enveloping it in a rubber tube. In that way he had always avoided accidents.

Occipito-Posterior Presentation.—Tarnier ¹⁵_{May, '96} points out that spontaneous delivery may take place in one of two ways when the occiput is posterior: in one case the occiput undergoes a long rotation forward, so that an occipito-posterior is converted into an occipito-anterior case; in the other the occiput remains behind in the hollow of the sacrum, and, if the perineum is yielding and the pains strong, the head is delivered in this position, the posterior fontanelle being the first part of the child's head to be born. Supposing that the occiput does not rotate forward and the head does not advance, an attempt should be made to rotate it forward with the hand, and this can often be accomplished because the head still remains movable. If the occiput is to the right, the left hand is introduced and the head seized, the thumb being placed behind the ear. The head is then rotated from right to left and from behind forward and the hand retained in position, because otherwise the occiput will again turn backward, owing to the fact that the shoulders have not rotated forward with the head. The right blade of the forceps should now be introduced, and after being placed in position is intrusted to an assistant to hold. By this means when the left hand is withdrawn the head is still retained in place. The left blade is then applied and the blades locked. On making traction farther rotation takes place as the head descends.

Uterine Inertia.

When dilatation of the cervix is delayed on account of insufficient uterine contraction, the movable foetal head may be found nearly always above the entrance of the true pelvis. Under these circumstances Kielman, of Breslau, ²⁴_{Oct. 7, '94}, ¹⁴⁷_{Feb. '96} advises the forced

engagement of the child's head in the pelvic cavity by means of manual pressure exerted through the abdominal walls. This method, employed by several obstetricians (Hofmeir, Müller, and others), in cases of contracted pelvis, sometimes as a means of measurement, sometimes for therapeutic purposes, is the most efficacious treatment of simple uterine inertia in women of normal size. As soon as the head is forced to engage in the pelvic cavity the cervix begins to dilate with astonishing facility, and delivery is soon effected. But this forced engagement requires energetic pressure, which can only be exercised during profound chloroform narcosis. One hand should be placed upon the child's head and the other upon the lower maxillary region and pressure exerted in the direction of the sacral cavity. The bladder should be emptied and the membranes ruptured before beginning the operation.

J. Lee Hagadorn, of Fullerton, Cal., ⁴⁴_{July, '96} reports a case of complete uterine inertia. The patient had been in labor thirty hours, but there were no real pains. Eight ounces (250 grammes) of chloroform were given with but little effect; so he determined to put on the forceps without anæsthesia, and, although the patient struggled violently and the head was high up, succeeded in bringing it down to the pelvic outlet. At this juncture the patient and those present forbade any further attempts, and he was compelled to desist. The child could be distinctly heard crying *in utero*. The patient was almost exhausted, and rupture of the uterus was imminent, when he injected $\frac{1}{5}$ grain (0.0025 gramme) of strychnia and grasped the fundus with both hands. In four minutes three tremendous bearing-down pains came and without further trouble a twelve-pound boy was delivered. The placenta was extracted by the method of Credé, and little hæmorrhage followed. G. D. Thomas, of Chicora, Pa., ¹⁹_{Mar. 2, '96} also records a case of delayed labor in which the child was heard to cry *in utero*. Schaller ¹⁴_{May 1, '96} records the same phenomenon in the course of a podalic version accompanied by strong traction on the child's foot.

Olenine ⁵⁸⁶_{No. 28, '96} has used strychnia in 16 cases of insufficient uterine contraction during parturition. Among these patients 4 were primiparæ, anæmic, aged from 19 to 32 years; 3 were multiparæ about 30 years old; 5 had chronic metritis; in 2 the uterus was inert; 1 was a syphilitic in the tertiary period, and 1 an hysterical subject with inflammation of the appendages. In the first two cases delivery progressed rather slowly, notwithstanding the administration of the strychnia, and it was necessary to resort to the use of the forceps; in all the others the labor ended rapidly and without accidents; the children are living. The uterine involution was perfect. The strychnia was administered in doses of from

0.002 to 0.0025 gramme ($\frac{1}{80}$ to $\frac{1}{40}$ grain) twice a day during the last six or eight weeks of pregnancy, with an interval of one week in each case.

Abrajanoff ¹¹⁵⁸_{Feb. 1, '96} reports a case in which after a subcutaneous injection of strychnine of 0.001 gramme ($\frac{1}{80}$ grain) the child was born in a state of asphyxia; the cord was barely cut when the child was taken with tetanus, the body bent backward, and the arms and legs extended. The convulsion lasted half a minute, and the child soon made the first inspiratory movement and gave a cry. This case proves that the strychnine passed through the placenta into the circulatory system of the child, and also proves that even a small dose (0.001 gramme— $\frac{1}{80}$ grain) has an influence upon the fœtus. It would therefore be preferable to use even weaker doses, 0.0005 gramme ($\frac{1}{160}$ grain), for instance, and make two injections. Uterine involution took place in a regular manner, but lacteal secretion was slight, though the patient declared that in her previous confinements the milk was always plentiful.

John T. de Mund, of Ringwood, N. J., ⁵⁹_{Oct. 1, '96} in commenting upon the use of tartar emetic in tedious labor, says that this agent is an admirable oxytocic. He gives 10 grains (0.65 gramme) in one-half tumbler of water and gives 2 teaspoonfuls every ten or fifteen minutes till free emesis ensues.

Francis P. Cowan ²⁰²_{Aug. 10, '96} reports a novel method of assisting uterine inertia,—namely, placing a glycerin suppository in the rectum, which has the effect of stimulating uterine activity. P. L. Ferrari ⁸⁷⁶_{Dec. 31, '94} refers to the employment of glycerin for inducing labor, and concludes (1) that glycerin injected into the uterus does not possess a constant and reliable action, nor does it produce a certain result; (2) that it is dangerous, owing to the changes which it produces in the blood and kidneys, and should on no account be used when the latter are diseased, and (3) that death of the fœtus also may result.

According to Remy, of Nancy, ²³⁶_{Feb. '96} succinate of ammonia is very useful in spasmodic, cramp-like pains and in partial contraction of the internal os during parturition. Coromilas, of Calamata, Greece, ¹⁴⁷_{May, '96} claims that quinine, given during pregnancy, may cause uterine contractions and bring on miscarriage. He therefore recommends it as an oxytocic.

Kielmann ²¹_{Dec. 31, '96} states that during the period of expulsion morphine is useful in virtue of its analgesic action; by partially doing away with the pain it enables the mother to assist the expulsion by voluntary contractions. It should, however, be carefully used in primiparæ, for the pain, while rendering the labor less energetic, indirectly protects the perineum.

Rigid Os Uteri.

Farrar, of Gainsborough, ²²_{Nov. 14, '94}, describes a new method of dilating a rigid os uteri, which he discovered accidentally. Having vainly attempted to overcome the resistance of the os in a case, he concluded to incise it, and placed a pledget steeped in a 10-per-cent. solution of cocaine in contact with the cervix. After waiting three or four minutes, knife in hand, he removed the pledget, when he found that the os no longer opposed the downward progress of the child. Two months later he again obtained a prompt result by a similar application of cocaine.

William Donovan, of Birmingham, ²²_{Nov. 21, '94}, in referring to Farrar's method, states that he had had prepared some cocaine-cones fitting the finger, which were readily introduced and kept in contact with the os during dilatation. They contained $\frac{1}{2}$ grain (0.03 gramme) of cocaine in cacao-butter. He used them in two cases, both primiparæ, in which the os dilated slowly and with pain. The only result he got was a protracted labor and a badly- or feebly-contracting uterus, and in both cases he had to resort to the forceps. The author states that he has found a plan which has proved unfailing, and he does not consider it so heroic as incising the os; his theory is that, when the incision is made, there is no assurance that the incision will not degenerate into a tear reaching into the uterine wall. His plan is to introduce one of the blades of forceps and press it gently and steadily against the os, keeping it *in situ* with one finger. In a very short time the os gradually and steadily relaxes, and the blade can be passed into position and followed with the second blade.

John F. Taylor, of Lagrange, Ky., ¹_{Feb. 1, '96}, cites a case of rapid dilatation of the cervix uteri by means of placental forceps. He found the patient, a primipara aged 18 years, in the most violent convulsions, and heroic means were necessary. He introduced the instrument into the os and by a slow, steady pressure of twenty or thirty seconds, with intervals of ten or fifteen seconds, in ten minutes he succeeded in dilating sufficiently to introduce the large forceps, and delivered in about half an hour.

Dührssen, ⁹⁵_{Nov. 11, '94}, ⁹⁰_{June, '96} gives an account of all the cases observed by him in which incision of the os was made to assist parturition. According to the author, the method of treatment is unaccompanied by danger in all cases in which the patient has not been infected, and in the hands of men of experience, when full attention is paid to the rules of antisepsis. Incisions of the cervix may prevent the need for perforation of the living child and may generally avoid proceedings dangerous to the mother or the child. Twenty-seven cases are mentioned in which perforation of the

foetal head was avoided by means of incisions of the cervix. The mortality amounted to one mother and one child.

The necessity for deep cervical and for vagino-perineal incisions usually arises in cases of elderly primiparæ. Before making incisions it is, of course, necessary to ascertain by careful examination that the dystocia does not arise from pelvic deformity or from extreme abnormality of the foetus.

J. Clifton Edgar, of New York, ²⁷_{June, '96} reports three cases in which he resorted to deep incisions of the cervix to induce rapid delivery in eclampsia, all cases of extreme urgency threatening immediate death to mother and child. He considers that the operation is a serious one and not to be undertaken without thorough familiarity with the mechanism of dilatation and the surgical anatomy of the parturient cervix.

Vulvo-Vaginal Abnormalities as Retarding Conditions.

Brindeau, of Paris, ⁷⁸_{Aug. 24, '96} reported two cases of dystocia due to the resistance of the vaginal orifice. Mathews Duncan was the first to establish the fact that the vaginal orifice exercised a retarding influence upon delivery in primiparæ. Budin then took up the question and demonstrated that in primiparæ the resistance met by the head at the level of the peritoneal floor constitutes the principal cause of ordinary deformations of the skull. Chambrelent, of Bordeaux, ¹⁸⁸_{July 21, '96} reports a case of dystocia through retraction of Bandl's ring. Allen A. Rawson, of Corning, Iowa, ²⁸_{Sept., '96} reports a case of obstructed labor due to stricture of the vagina.

Edwin T. Ensor, of New York, ⁶_{Sept. 23, '96} gives an account of a case of unruptured hymen at full term of pregnancy. The hymen was ruptured in the application of the forceps, but there was no perineal laceration, and the child, a well-developed female, was living. The total duration of the labor was forty-five hours. Both mother and infant did well.

A. Goldberg ⁸¹⁷_{Nov. 22, '94} cites the case of a woman who had been delivered with forceps in her first confinement and who presented, two months later, a cicatricial annular contraction of the vagina, which scarcely admitted the introduction of a finger. She refused any operation. A second pregnancy occurred a year later and the vaginal stenosis formed an obstacle to parturition. The writer in vain attempted to apply the forceps; he was obliged to resort to perforation of the cranium.

Multiple Births.

Th. V. Speyr, ¹⁵²_{Aug. 9, '96} in referring to the subject of heredity in twin-bearing, states that Darwin expressed the opinion that the

tendency to twin pregnancies is transmitted in families in the human race, while Goehlert furnished statistical proof of the fact. Speyr has made a study of the subject and confirms the assertions of his predecessors. It is known that, on an average, there is one twin confinement among eighty. The heredity of twin-bearing, if we may use the expression, is transmitted not only by the twins, but also by their brothers and sisters. A fact difficult to explain is that this heredity is transmitted in about the same proportion by the father as by the mother. The weak vitality of twins is demonstrated by Goehlert's statistics: only 36.9 per cent. reach the age of 20 years. Males appear to be more delicate than females, the average life of the former being 7 years and 7 months, and that of the latter 10 years. Twins seem to possess limited fecundity. While from eighteen to twenty sterile unions are usually noted, the proportion reaches twenty-eight or twenty-nine when one of the couple is a twin. The author has likewise noticed that triple or quadruple births are particularly met with in families where there have been twins. The heredity also shows itself in a certain number of abortions in twin pregnancies. The influence of heredity on the tendency to give birth to twins is well shown in papers by Thomas Wakley, of London, ⁶_{Nov. 22, '38} and Donald Macphail, of Whifflet, ⁶_{Dec. 7, '38} by means of illustrative cases.

Hellin, ¹¹³_{Nov. 22, '94} after a close study of the subject, concludes that multiple pregnancies generally arise from the simultaneous rupture of several follicles. This simultaneous rupture is due to the abundance of ovules in the ovary, which also explains the fact that women who have twin pregnancies are generally very fertile. A great fecundity and twin pregnancies are thus two results of a common cause,—the number of ovules contained in the ovary. Frequent twin pregnancies is a manifestation of atavism.

Drejer, of Christiania, ⁵⁰_{July 20, '96} after a comparison of the statistics furnished by the lying-in hospitals of Scandinavia and a study of a considerable number of personal observations, concludes that the ratio of uni-ovular to bi-ovular twins is as 1 to 3.7,—a much larger proportion of uni-ovular twins than other investigators have found. In ninety-six cases the placentas were weighed, and were found to be as heavy relatively as in single pregnancies. The umbilical cord was, as a rule, shorter than in normal pregnancies, and its insertion was frequently marginal.

Tigmund Mirabeau ²¹⁴_{Dec. 15, '94} has analyzed seventy-five cases of triple births recorded in literature, and finds that these births generally occur among multiparæ who have also had abortions and belong to families in which multiple births have already been observed. The generality of the mothers are between 30 and 34

years old. The frequency of triple births varies in different countries; it is greatest in Russia and in Sweden and most rare in France and Germany. Of 105 children born in triplets 56 were girls and 49 boys, about one-half of the number being viable. Pelvic presentations are much more common than in simple labors. The prognosis is good for the mother.

Charles, of Liège, ²⁵⁶_{Oct. 21, '94} describes a case of triple pregnancy in which two of the foeti died the fourth month and were expelled at term with a fully developed child.

Freudenberg ³⁵⁴_{Aug. '96} reports a case of triplets, two of the foetuses being acardiac. Vassali ⁹⁹_{Mar. 7, '96} gives an account of the birth of six children at one birth, which is said by von Herff to be the first well-authenticated case on record. The patient was a II-para 36 years of age. All the foetuses were born alive and moved vigorously; the sexual organs were differentiated, four being males and two females. The large single placenta bearing the six amniotic sacs was, unfortunately, so lacerated that further investigation of it was useless. Convalescence was practically normal.

Epsztein ⁷⁸³_{Nov. 4, '94} describes a case of twins in which one child was born six days before the other. Labor proceeded naturally and both the children lived. Ulecia ⁸⁹_{June 10, '96} gives a summary of a case of twins with mummification of one foetus reported by Cabrera, of Havana. After the birth of a living foetus there was placental retention with syncope. The placenta was extracted manually. The living foetus died some hours after birth from tetanus. Lambinon ²⁵⁶_{Nov. 24, '96} also reports a case of twin pregnancy in which a female child was born alive and well and afterward a mummified foetus was expelled. Grace Peckham-Murray ⁵⁹_{June 1, '96} records a case of twin pregnancy with a blighted foetus.

Obstetric Forceps.

Schmid ⁶¹_{Dec. 15, '94} gives a series of 2926 deliveries in the Basel Hospital, between May 1, 1887, and December 31, 1893, of which number 156, or 5.33 per cent. of the total number, were delivered by the forceps, and of these 129—83.3 per cent.—were primiparæ. Presentation in the second position was the most frequent cause for their use. The loss of blood was estimated at 591 grammes (19 ounces) on the average. In 132 cases—84 per cent.—the perineum was ruptured, and the wound healed by primary union in 92 cases. The mortality from all these deliveries was 1.28 per cent., but this was not due to the application of the forceps. The infant mortality was 122 per cent.,—5.7 per cent. being the result of use of the forceps. Schmid recommends their use when the pains diminish owing to the prolonged labor, when

the head is in a proper position, and when the second stage has lasted more than two and a half hours.

Shlick ¹¹⁹⁰_{2.1.14.4}, ⁵_{Oct. 76} gives the results of the use of forceps in 2920 labors. Birth was completed by forceps in 3.63 per cent. of cases. The majority of the cases were primiparal, between 20 and 30 years old. In 60 per cent. of cases the mother was lacerated. The maternal mortality was 4.7 per cent., while 11.32 per cent. of children perished. Of the mothers, 1.8 per cent. had septic infection. The conclusion reached, from comparing the use of forceps with other methods of delivery, is that the forceps is the bloodiest method of delivery, and that its mortality-rate renders it a serious procedure for mother and child. Other means of accomplishing delivery should be exhausted before recourse is had to the forceps.

Umbilical Cord.

Lefour and Oui ³_{Aug. 21, 76} have made a number of experiments for the purpose of determining the force of traction necessary to arrest the flow of blood in the umbilical vein when there are one or several knots in the cord. The results of their experiments show that, contrary to the facts generally accepted, (1) slight traction (25 to 90 grammes) is sufficient to arrest the circulation where there is but a single knot, and (2) the traction is perceptibly stronger to attain the same result when there are 2 knots (45 to 100 grammes) or 3 knots (135 grammes).

Tarnier ³¹_{Sept. 22, 74} states that a form of asthenia or atresia of the cord may arrest the circulation, and that this asthenia is observed in three conditions: 1. When, owing to the knots in the cord, the calibre of the vessels becomes so small that the child is not nourished. 2. When there is torsion of the cord which is sufficiently pronounced to produce flattening and obliteration of the vessels. In certain cases the torsion is limited to a very small area, and, if it become too severe, it causes rupture of the cord. 3. Finally there are cases in which the asthenia is produced independently of the knots of the cord or its torsion.

Lefour, of Bordeaux, ¹⁴_{Sept. 8, 76} called attention to the influence of internal rotation of the head in the production of coiling when the former leaves the oblique position to place itself in the sacropubic diameter. When the head begins its movement of internal rotation, according to the direction of this rotation and of the kind of coil present, the latter will either become looser or tighter. In the latter case this tightening of the cord will hinder the foetal circulation, sometimes even to the point of causing the death of the foetus. Again, when the cord is thus tightened, the internal movement of the head, particularly in the posterior position, is

only effected with great difficulty, because there is a struggle against the tension of the cord. The result is that, in such cases, it is often necessary to complete the rotation movement of the head with the aid of the forceps. If, however, with the instrument, a great force is required to complete this movement, there is the danger of entirely interrupting the funicular circulation by increasing the tension of the cord. The author, however, delivered a living child with the forceps under the above conditions; it was in an apparent condition of death, and was only revived at the end of an hour and a half. It died on the following day.

McGillicuddy²¹⁸_{July, '94} states that in about 25 per cent. of all labors the cord is either bound round the child's neck or is in some other anomalous condition. *Suicidium foetus in utero* is often referred to by the older writers as being of common occurrence, and there can be little doubt that it is not rare. Excessive coiling about the neck may prevent flexion of the head. Delay from the child being simply held back by a coiled or short cord is also described, but the treatment is not satisfactory. McGillicuddy advocates placing the woman in a sitting or squatting posture, as in this position the abdominal tension is increased, as in defecation, and the action of gravity brings the uterus farther down. In one of the cases the patient felt a dragging sensation in the umbilical region whenever she raised her hands, and attributed this to the cord being around the child's neck. McGillicuddy says the mother's apprehension was founded on what he calls a plausible theory: that, when the mother performs certain movements, the child performs the same movements, and that it is a firmly rooted belief among many of the knowing old women that pregnant women should not reach upward lest they cause entanglement of the cord. Most popular notions, no matter how fantastic, are often founded on a certain amount of fact.

Bishop⁵⁹_{Nov. 9, '96} cited a case of unusual entanglement of the umbilical cord. After delivery had taken place the cause of the death of the foetus became apparant, for the cord was found entwined around the left thigh in the form of a slip-knot; so that every movement of the leg caused it to draw tighter. The leg was œdematous, showing that the knot had only gradually drawn so tight as to completely obstruct the circulation.

Wygodzky³¹⁷_{No. 48, '96; Jan. 1, '96} cites an instance in which the funis was very tense and coiled seven times around the neck and once round the left shoulder; there was also a distinct knot. It measured over sixty-five inches in length. The foetus was a male, slightly macerated. It weighed over five pounds, and was easily delivered entire after division and unwinding of the funis. No marks re-

mained on the neck. The placenta followed ten minutes later, and, as far as naked-eye experience could indicate, it seemed healthy.

Harvey, ²_{Feb. 1, '96} described a simple apparatus for replacing a prolapsed funis. It consisted of two loops of tape, an upper and a lower, stitched together. The cord was put through the lower loop. The upper loop was carried up into the uterus on a rod of any kind,—a bit of bamboo, a catheter, or a stilette. The introducer was taken out during a pain, and the tape left behind.

H. J. Sequeira, of London, ²_{Apr. 30, '96} reports a case of rupture of the umbilical cord at its placental insertion during delivery.

Doktor ⁹⁵_{N. 45, H. 2} comments upon the treatment of the umbilical cord in newborn infants and the prevention of infections. According to Erös, 68 per cent. of umbilical wounds do not heal in a normal manner, and, of these, 45 per cent. suffer from fever. How often these cases terminate fatally is not known. Too often cleanliness is neglected by the nurse. The author experimentally omitted the oiling of the rag usually resorted to, as it was thought to hinder mummification. The temperature was then taken twice daily. Iodoform was applied to the wound, or, if needed, a weak carbolized wash. With this treatment 35 per cent. of cases had fever, and of these 16 per cent. showed infection. To further improve the results the cord was removed as early as possible and all wetting omitted, and the bandage changed daily. After this, 25.8 per cent. showed a rise of temperature, and of these 10 per cent. had infection. Marked improvement resulted, however, when the ligatures were applied closely to the belly, the stump being only one centimetre long. This gave only 11.88 per cent. of fever and 3.46 per cent. of infection. The author therefore advises to cut the cord as closely as possible and to only change bandage when absolutely necessary. Preferably, the bath should also be omitted.

Post-partum Hæmorrhage.

Tarnier, ³⁴²_{Feb. 1, '96} teaches that flooding after the application of the forceps must always be expected, since the instrument is usually employed because of uterine inertia,—a source of hæmorrhage. The danger comes when the placenta is expelled. Tarnier, when called to apply the forceps for a colleague in private, used to leave before the delivery of the placenta. In consequence he was very often called back.

E. L. Tompkins, of Washington, ²⁷_{Apr. '96} reports a case of secondary post-partum hæmorrhage eighteen days after labor followed by septicæmia and death.

Some time since Budin called attention to hæmorrhages caused by the rupture of the circular placental sinus. A similar case was reported to the Society of Gynæcology at Bordeaux by Hirigoyen.¹⁴ Lugeol likewise reported two analogous cases at the same meeting.

N. Mayne¹⁸⁰ states that for some years he has used spirits of turpentine in post-partum hæmorrhage, and always with the best results. A piece of lint is saturated with the turpentine and introduced into the uterus; upon holding it against the walls rapid contraction took place and all hæmorrhage instantly ceased. He considers that it is much quicker and surer in its action than any other remedy, does not cause any injurious result, and is much more easily applied.

V. H. Moore, of Kingston, reports two cases of severe post-partum hæmorrhage treated successfully by the method of saline arterial infusion.

Placenta.

Maggier,²⁰⁰ writing upon the frequency of the insertion of the placenta upon the lower segment of the uterus, says that in 6946 labors 2908 times the placenta was inserted at a distance of more than nine centimetres from the internal orifice (42.33 per cent.), and that 3938 times it was inserted at less than nine centimetres. A central insertion was never observed. The head presented in 93.52 per cent., the breech in 2.46 per cent., the shoulder in 0.41 per cent., and the face in 0.12 per cent.

Hæmorrhage was observed in the following proportions:—

	First Third. Per Cent.	Pregnancy. Second Third. Per Cent.	Last Third. Per Cent.	Labor. Per Cent.	Delivery. Per Cent.	After Delivery. Per Cent.
Primiparæ . {	1.16	1.02	4.81	2.77	2.48	1.60
	0.60	1.56	2.17	1.12	1.12	1.21
Multiparæ . {	1.79	3.07	6.02	4.23	1.79	1.53
	0.90	0.90	2.79	0.90	1.27	1.36

Premature rupture of the membranes was met with in 13.90 per cent., precocious rupture in 16.67 per cent. Abortion in 0.50 per cent. and premature confinement in 17.72 per cent.; more frequently in primiparæ than in multiparæ. Procidencia of the cord is frequent,—0.70 per cent.; procidentia of the members, 0.86 per cent.; and procidentia of the cord and members, 0.10 per cent. Maternal mortality is 0.10 per cent., and foetal mortality, 2.51 per cent.

Placenta Prævia.

Boss³¹⁷ studied 133 cases which occurred in two Breslau institutions. In one of the latter the proportion of placenta

prævia to normal labor was 1 in 216, in the other 1 in 42,—a remarkable difference. In 27.9 per cent. the placenta was central, in 61.6 lateral, in 10.5 marginal. The percentages of presentations were as follow: Head, 66.2; breech, 1.8; feet, 8; and transverse, 24. Of the total 133 mothers 8 died,—5 from direct effect of loss of blood and 3 from fever or exhaustion after the first week. Twenty-seven per cent. of the children were born alive. As for management, the tampon, with expectant treatment, was applied in 7 cases, rupture of the membranes with forceps in 9, forced labor in 1, and combined version in 115; in this latter category all the maternal deaths occurred. The cases, however, in which combined version was employed were all severe. One patient died from air in the veins nine hours after labor.

Nijhoff, of Amsterdam, ³¹⁷_{Nov. 9, '95} reports a case of placenta prævia centralis, and employed the following method: As soon as the internal os could be entered by one or two fingers he bored through the placenta carefully, so as not to penetrate the amnion, and released the amnion as far as possible. Then, by rubbing over the fundus of the uterus with the other hand, he excited a contraction to make the amnion protrude into the tear, and finally tamponed the vagina with iodoform gauze. Close watching is necessary in these cases. If the amnion is unintentionally penetrated at the time of operation, he advises that combined version be performed, bringing down a foot, and that the lower uterine segment be plugged up, as it were, with a hip.

Interesting in this connection is the case of Brindeau, ²⁸⁶_{Sept. 1, '95} in which there was spontaneous delivery by the passage of the head through the placenta. Upon examination the os was found dilated to the size of a silver dollar, the membranes were ruptured, and the finger penetrated directly upon the neck. The placenta was nowhere to be felt, but no attempt was made to place the finger between the head and neck of the womb. Dilatation was complete half an hour later and the woman was rapidly delivered of a living child weighing 2030 grammes (4 pounds). During the period of dilatation no blood flowed from the vulva, but several minutes after the expulsion of the fœtus there was a considerable hæmorrhage. The peculiar feature in this case was the fact that the bag of waters had spontaneously ruptured through the placenta. Usually, in cases of central placenta prævia the obstetrician is obliged to perforate this organ in order to terminate the delivery. Here the opening was made spontaneously, thanks to the especial thinness of that portion of the placenta which was in contact with the lower segment. The head, pushed downward by the uterine contractions, pressed directly upon the placenta.

Under this pressure the tear became larger, and the cephalic extremity engaged directly into the cervical orifice; thus the finger arrived directly upon the head. As the placental crown remained adherent to the lower segment of the uterus, the neck, in extending upward above the head, drew with it the placenta, and thus the diagnosis of placenta prævia was not and could not be established during the labor.

Palchowsky³¹⁷_{No. 5, p. 212, '96} reports a case of placenta prævia with twin pregnancy. The children were asphyctic, and one less well developed than the other. The placenta of the first was expelled after the lapse of ten minutes; the portion situated at the os was filled with thrombi and infarcts. The second placenta was removed after the lapse of two and one-half hours. The central portion was firmly adherent to the uterine wall. One of the children died an hour and the other two and one-half hours after birth. The puerperium was uncomplicated. Kahn²¹_{No. 10, '96} also cites a case of twin labor with placenta prævia centralis.

A case of air-embolus in placenta prævia has been cited by Henck.³⁹³_{B. 22, H. 1} The air penetrated between the uterine wall and the detached placenta at the moment when the hand was introduced to practice version; it entered the large veins of the placenta and remained there during the effort and the flow of the waters; as soon as the abdominal pressure ceased it reached the lower vena cava and the heart, and the movements of the latter ceased immediately. M. S. Dibrell, of Van Buren, Ark.,⁵⁰⁶_{Oct., '96} gives an account of a case of placenta prævia followed by tetanus.

Retention of Placenta or Placental Relics.

Ernest Gallant⁵⁹_{May 18, '96} cites a case in which the placenta was retained *in utero* one year. Impregnation took place, the foetal sac locating over the os internum. The main symptom was hæmorrhage, as in placenta prævia. A. W. Douthwaite²³⁵_{Sept., '96} reports retention of the placenta for thirteen days, due to hour-glass constriction. Septicæmia followed, but ended in recovery.

A lobe of a placenta sometimes remains adherent to the uterine wall after the rest of the placenta has been expelled. Budin, of Paris,⁷³_{May 26, '96} states that, if the retained mass were attached to the placenta, examination of the uterine surface of the placenta will show where it was broken off. If a true placenta succenturiata be retained, its presence would be indicated by Tarnier's sign. If one examine the membranes uniting the placenta to the secondary placenta, the open mouths of the vessels which connected the two placental masses will be seen.

Sometimes, however, the diagnosis is very difficult or impos-

sible. Tarnier's sign would fail if the smaller placenta were in juxtaposition to the larger, but not united. The vessels in this case would not lie in the membranes. The sign would also be absent if the membranes were torn off close to the placenta proper, leaving the membranes which united the two masses attached to the segment in the uterus.

Hartmann and Toupet⁴⁸,² study the changes which non-septic fragments of placenta may undergo when left attached to the uterine wall. These changes are (1) simple sclerosis of the placental tissue, (2) benign deciduoma, (3) hydatidiform mole, and (4) malignant deciduoma. In all, chorionic villi are to be detected by aid of the microscope. By benign or innocent deciduoma is understood the true placental polypus and more sessile growths, in which there is distinct evolution going on in the chorionic villi and no sclerosis of the connective tissue. The growth does not, however, recur after thorough removal. The authors relate a case where, as usual, the prominent symptom was frequent metrorrhagia. Lejars and Lévi⁴⁸ describe a case of placental polypus with the same symptoms. The malignant deciduoma which Hartmann and Toupet term "chorion-cell sarcoma" and the hydatidiform mole are, in their opinion, related. In the latter, —so long and so well known to the obstetrician,—just as in the former, which appears to be a disease but recently recognized, the growth tends to invade and even perforate the uterine wall. In these graver, as in the less serious, changes in retained placental tissue uterine hæmorrhages are always an early and prominent symptom.

Alberti,³¹⁷⁴⁹ alluding to the danger of using polypus-forceps for the removal of retained fragments of placenta, related a case of hæmorrhage after abortion, in which a medical man, after curetting, had introduced a forceps into the uterus to remove some remains of the placenta, and who, on withdrawing the forceps, found that he had dragged part of the intestine into the vagina. Alberti performed a laparotomy three hours later and found the uterine wall thinned away in every part. The intestine, which had been dragged through the uterus into the vagina, was constricted at the internal orifice and could not be returned till this had been slit in several places.

In the discussion, Veit, Olshausen, Gusserow, and Orthman reported cases almost identical which had occurred in their practice, not, as a rule, with the same fortunate results. All agreed that the polypus-forceps was a most dangerous instrument. Martin mentioned a case in which a very busy practitioner, believing that, although he had used the curette, he still felt some membrane in

the uterus, introduced a forceps and extracted about thirty inches of intestine, which he tore from the mesentery. Telling the family that this was the umbilical cord retained after the abortion, he left the patient in a state of collapse, and with his assistant hastened to Martin. The latter found the woman in *articulo mortis*, with the intestine between her thighs. The best he could do was to return the bowel into the abdomen and ask the attendant to report the events. The woman died in a few hours. Martin also spoke strongly against the use of polypus-forceps in such cases, but Flaischlen had found them necessary and useful in the cases in which abortion occurred in a uterus fixed in retroflexion.

Oui, of Bordeaux, ⁴⁸_{Feb., '96} in commenting on eight cases of curetting for the removal of placental remnants after abortion, states that two conditions are needed to insure safety and efficiency when the curette is used,—the cervix must be well dilated and the uterine cavity well explored by the finger. Chloroform is needless, except for very timid women; the curette gives less pain than is felt by the patient during manual extraction. A cutting—not a blunt—curette should be used. Oui finds the irrigating curette clumsy. Swabbing with creasoted glycerin or iodine and intra-uterine injections are needed whenever the curette is used, and after the swabbing the uterus and vagina must be plugged with iodoform gauze.

Inversion of the Uterus.

Beckmann ³⁸⁸_{R.B., No. 3, Aug., '96} ⁵ has collected one hundred cases of complete inversion of the parturient uterus and studied the mode in which the accident happened. He concludes that most cases happen without interference or manipulation on the part of the midwife or physician attending the case. Most cases occur in patients between the ages of 20 and 30 years, when strong and vigorous expulsive efforts are likely to occur. He believes that vigorous spontaneous expulsion of the child is the chief cause for this accident.

Von Herff ⁸⁴_{No. 2, p. 35, '96} explains as follows spontaneous inversion, in which no pressure was exerted, not even by the intestine, and where no traction was practiced during delivery. The complete absence of contraction, due to exhaustion caused by a very long confinement, in a primipara 42 years old, had allowed the fundus to give way to the simple atmospheric pressure exerted upon it, while the occlusion of the vagina prevented the access of air in the interior of the uterus.

Vogt ³⁶⁹_{p. 647, '94} ⁶⁷³_{Mar., '96} observed a case of spontaneous involution of the uterus after acute inversion. A primipara of 42 years had been delivered by the aid of forceps, and the placenta had been

expelled. Compression of the uterus and vaginal arch was made to arrest hæmorrhage, when the hand, introduced into the vagina, felt the uterus move and the fundus descend, while the other hand, applied to the abdomen, could feel no trace of the uterus. Hot water was immediately injected, when the uterus ascended, resuming its normal position. (Report of Corresponding Editor Levison, of Copenhagen.)

A. E. Aust-Lawrence, of Bristol, Eng., ^{Nov. 1, '96} reports a case of post-partum inversion of the uterus of three months' duration reduced in thirty-four hours with Aveling's repositior.

Rupture of the Uterus.

Davidoff ¹¹⁵³_{Dec. 4, '96} has made a study of the elastic fibres of the uterus in spontaneous ruptures occurring during pregnancy and parturition. The physiological researches made by the author have led him to the following conclusions: 1. The modifications of the elastic fibres at the point of rupture may explain the latter from an anatomo-pathological point of view, particularly in the cases in which there are no other lesions. 2. In ruptured uteri the elastic fibres are modified throughout the entire body of the organ, but the rupture occurs at the spot where the modifications are most accentuated. 3. Spontaneous rupture only occurs when there is an alteration in one of the constituent portions of the uterus; the uterine tissue never or, at least, only very exceptionally tears, whatever be the obstacle to parturition.

Sänger ⁴⁹_{Aug. '96} divides the ruptures of the uterus anatomically into slits, clefts, manifold and combined connected ruptures, internal and external fissures, and those due to faulty development; and, according to their mechanical and predisposing causes, into spontaneous ruptures from abnormal processes during pregnancy or parturition, or abnormal conditions of the uterus and vagina, and violent ruptures from internal injury, operative or otherwise, or from external injury. He does not consider post-mortem rupture established.

Great importance must be conceded to predisposition, without which the mechanical factors are not sufficient to explain all cases. Predisposition may be acquired from illness, from degeneration (hyaline or fatty) of the muscular tissue, from cicatrices of previous ruptures or of Cæsarian section, from local thinning of the uterine wall, from placenta prævia, or may be congenital,—e. g., from malformation of the womb.

Wm. Harris Best, of Ilford, Eng., ⁶_{May 1, '96} reports a case of rupture of the uterus at the onset of labor. This accident is of rare occurrence. The patient died thirty-six hours after the birth

of the child with symptoms of peritonitis and exhaustion. No post-mortem examination could be obtained. The points worthy of particular notice in this case appear to be (1) the very early stage at which rupture occurred; (2) the absence of any other exciting cause than the faulty position of the child, no marked anteversion of the uterus having been made out, and (3) the comparative mildness of the first symptoms occurring after so grave an accident.

Brunon ²²⁸_{Oct. 16, '96} cites a case of rupture of the uterus on a level with the cervix, consequent upon a cicatricial septum of the vagina. Armin Treu ²¹_{Nov. 17, '94} reports the case of a multigravida whose child died within the womb, and in whom labor ceased by reason of absorption of putrid material from the child. On examination the lower portion of the uterus was found bound down by an old and firm adhesion extending across the posterior surface of the lower uterine segment. In performing version the lower uterine segment ruptured just above this adhesion, the rupture being complete. The fœtus and placenta, however, were removed manually, and the patient made a complete recovery.

Treatment.—Fritsch ¹¹⁸_{June 9, '96} states that, if the rupture is diagnosed and the child has completely escaped into the abdominal cavity, it should be extracted as quickly as possible by laparotomy, but, if it has only partially escaped from the uterine cavity, extraction through the natural passages is to be preferred when this can be done. In cases in which hæmorrhage is profuse or extraction through the vagina impossible the abdomen should be opened. After uterine rupture the patient may die from loss of blood or sepsis. Fritsch does not believe tampons or pressure are of any use in controlling the hæmorrhage in these cases, nor does he think that the bleeding vessels can be safely ligatured through the vagina. In cases, therefore, where the loss of blood is sufficient to threaten the patient's life the abdomen should be opened and the bleeding vessels secured. If, however, when the patient is first seen the bleeding has already stopped, absolute rest combined with the internal administration of opium is the best treatment. Vaginal douches should not be employed, nor should the uterus be extirpated, unless a myoma is present in its walls or unless it is clearly infected.

Fenner, ³¹⁷_{Nov. 1, '96} after extraction of the child, treats the rupture by tampons of iodoform gauze introduced through the vagina; he describes two cases successfully treated by this method. He points out that the prognosis depends largely on the fact whether the labor has been conducted aseptically or not. Cholmogoroff describes ³⁹³_{Nov. 21, '91} a case in which he was able to suture the edges of

the uterine tear through the vagina after the uterus had been drawn well down by means of a volsella. The lacerated edges were trimmed and united by sutures, the lower angle of the wound being left open. Through this aperture a long strip of iodoform gauze was introduced into the peritoneal cavity and was left *in situ* until the eighth day. The uterine cavity and the vagina were also packed with iodoform gauze, with the result that all bleeding ceased. The patient recovered.

Maternal Dystocia.

Contracted Pelvis.—Neugebauer¹¹⁸⁰_{21, 24} has collected accounts of 196 labors in cases of kyphotic pelvis in 113 women. Of these, 126 were full-time, normal labors; 14 were premature (3 being abortions); in the remaining no history was given as to the time of delivery. Of the 113 women 46 died,—14 after Porro or Cæsarian section, 2 died undelivered; another of an eclamptic condition after attempts were made to employ turning, forceps, and cephalotripsy, 10 after forceps were used (in 2 eclampsia, in 3 rupture of the symphysis, in 2 chloroform poisoning, in 1 œdema of the lungs, and in 2 asphyxia, so-called), 1 after employment of the lever, 1 after rupture of cervix and vagina, 1 after rupture of uterus, 1 after *accouchement forcé* and rupture of cervix, 1 of post-partum hæmorrhage, 3 of asphyxia after delivery; 8 after craniotomy, cranioclastm, cephalotripsy; 1 after artificial premature delivery, 2 after normal labor, and 1 condition not given. Neugebauer believes that, in a considerable number of these, sepsis was the cause of death.

Klien⁹⁵_{2, 30, 31, 76}; ⁵_{Jan., '96} analyzes reported cases of labor in kyphotic pelvis and personal cases and reaches the following conclusions: The kyphotic pelvis is met with but rarely in labor; on the average, 1 case in 6016. The usual position and presentation were present in 97 per cent. of the cases. In one-third of all head presentations the back of the child was directed posteriorly. Face presentations are more common than in normal pelvis. The prognosis for birth in these cases depends largely upon the relationship existing between the distance between the tuberosities of the ischia and the biparietal diameter of the head. The possibility of the molding of the head and the elasticity of the pelvic joints are also factors of importance. From 58 to 60 per cent. of the cases required assistance in labor. In cases where the forceps is used the mother is exposed to two dangers,—separation of the pubic joints and injuries to the vaginal walls.

Austin Flint, Jr.,⁵⁰_{Oct. 28, '96}; ⁵_{Jan., '96} summarizes the records of 6000 cases of pregnancy in which contraction of the pelvis was noted in

654,—10 $\frac{2}{10}$. Comparison of the measurements of the head, weight, and length of the child with the measurements of the pelvis gave no definite results. In 86 $\frac{8}{100}$ per cent. (563 of the 654) delivery was spontaneous. In all of these cases the contraction was slight, the true conjugate being three and one-half to three and one-third inches. In 91 cases operative interference was necessary, and 101 operations were performed. The general results in the 654 cases of contraction of the pelvis were one maternal death from placenta prævia and shock. Of 663 children 31 were still-born,—a total infant mortality of 5 $\frac{5}{100}$ per cent.

Guéniot ¹⁹⁴_{Apr. 10, '96} gives an account of the treatment and results in 60 labors in various forms of contracted pelvis. Among this number osteomalacia was present once and an oblique oval pelvis once, the rest of the patients being rachitic. Of the latter the true conjugate diameter measured once 69 millimetres, 16 times from 75 to 82 millimetres, 21 times from 82 to 87 millimetres, 21 times from 87 to 92 millimetres, and once 95 millimetres. Twenty-four of the patients were primiparæ, 24 secundiparæ, and 12 multiparæ. Twenty-five of the women were spontaneously delivered. Thirty-eight times delivery was induced, principally by Krause's method. Fourteen times the labor was normal; 4 times it was obtained by the aid of forceps alone, and 3 times after symphysiotomy; 2 by version. Maternal mortality, 0; infantile mortality, 5.

Ahlfeld ¹¹⁹⁰_{Nov. 4, '96} discusses the value of Müller's method for determining the indications for induction of labor by pressing the head of the child into the pelvic brim. While this method has advantages, it is not to be relied upon solely. Ahlfeld prefers to estimate carefully the period of gestation, measure the length of the foetal body within the womb, to compute the length and weight of the foetus, and to combine these data with those given by palpation. It is also to be remembered that a foetal head which cannot be pressed downward into the pelvis can be brought through after version, the breech preceding.

E. A. Tucker, of New York, ²⁷_{June, '96} describes two cases in which deformity of the coccyx caused dystocia and death of the child. The first case is interesting because after two children had been killed by the deformed coccyx a third was born uninjured. In both cases the author fractured the coccyx from the sacrum by pressing forcibly backward with the thumb in the vagina. Recovery occurred in both cases, the bone remaining movable for twelve days in the first patient, and uniting firmly in the second in nineteen days, leaving the antero-posterior diameter of the pelvic outlet large enough to permit birth.

Induced Labor.—Vogt gives the results of 24 cases of artificial labor in 16 multiparæ.³⁶⁹_{p. 519, 76} These patients had previously borne altogether 64 children, 39 of which were dead-born. The conjugate diameter of the pelvis varied from 9.3 to 12 centimetres. In delivering 30 of the children an operation of some kind had been necessary in order to complete the labor, the infant mortality being 24 per cent. Krause's method was the one generally employed, sometimes combined with tamponade of the cervix and uterus with iodoform gauze and intra-uterine injections of glycerin.

E. P. Davis¹¹⁹_{Oct. 12, '96} recommends the following procedure: The patient being in the dorsal position, with legs flexed, the vagina is thoroughly injected with a mixture of creolin and water (1 drachm to the pint). A new, solid bougie, which has previously been thoroughly sterilized by immersion in a solution of mercuric chloride (1 to 500) for several hours, is then passed into the uterus and by gently twisting is allowed to insert itself between the membranes and the uterine wall. The bougie can be inserted through a speculum or guided by two fingers in the vagina. Great care must be exercised not to rupture the membranes. When only an inch or two of the bougie remain in the vagina a light tampon of iodoform gauze is inserted into the vagina and the vulva covered by a sterilized pad. For convenience, the bougie may be introduced in the afternoon; softening and partial dilatation of the cervix will occur usually by morning. If no contraction occur by morning, the first bougie may be taken out, washed, the patient given an antiseptic vaginal douche, and the first bougie re-inserted along with a second. Barnes dilators are generally employed to complete the dilatation.

Kufferath, of Brussels,⁶⁷³_{Oct. '96} described a simplified method of detaching the membranes in induced labor. It consists in irrigation of the inferior segment with sterilized water or boric-acid solution, using an Esmarch glass irrigator joined by a rubber tube to a glass S-shaped cannula half a centimetre in diameter. Moderate pressure is employed in the irrigation, the vulva and vagina being previously rendered aseptic. The danger of introducing air into the uterine cavity is avoided by letting the liquid flow as the sound is being introduced. One to two litres (quarts) of fluid are usually sufficient, and if pains occur the irrigation is discontinued for a time. Labor usually sets in in from five to six hours. In fifteen cases in which the author employed the method, no accident occurred. In the discussion of Kufferath's paper Lazarewitch stated that he had found the method very slow, it being necessary to repeat the irrigation thirteen times before obtaining the desired result. He had been more successful with deep injections of only

100 grammes (3½ ounces) of fluid, using a long sound. Tarnier, of Paris, regarded Kufferath's method as a good one, but recalled two cases in which the use of Kiwich's douche was followed by sudden death. It was after one of these accidents that he had invented his dilator.

L. M. Michaelis⁵⁹ gives the *modus operandi* of the elective accouchement (so-called "*accouchement forcé*") and its advantages as follows: The vagina is rendered aseptic by thorough use of soap and brush, followed by douching with an antiseptic solution. The cervix is drawn down with bullet-forceps and sterilized gauze packed into the canal through the internal os. The packing is continued in the vagina until it is completely tamponed. The patient then rests for from six to twelve hours, depending upon her condition, etc. This procedure softens the os and may alone bring on labor. The patient is anæsthetized, preferably with chloroform; the tampon removed, the parts resterilized, and one or two fingers, depending on the dilatation, are passed slowly into the cervix to the metacarpo-phalangeal joints and then are flexed and gradually withdrawn. Three or four fingers and finally the whole hand are used in the same manner. After repeatedly inserting the whole hand and withdrawing it flexed the cervix will be sufficiently dilated for the head to pass. The force must be firm, but gentle, pressure, the object being to fatigue the muscular fibres of the cervix. The child is then delivered with forceps or by version, as is required. The after-treatment is as usual.

In thirty-one cases which the author has collected, in one only was there serious damage done, a deep cervical tear, which was at once sutured, with an uneventful recovery. J. Henry Carstens²³ also recommends '*accouchement forcé*', which he has employed successfully during several years.

Obstetric Surgery.

After-coming Head.—P. Strassmann,³¹⁷ in writing upon perforation of the after-coming head, protests against expectant treatment in the cases in which the head is arrested behind and above the superior strait. Expression through the abdominal wall is, in his opinion, not frequently enough resorted to, either in the case of dead children or when they are still living. After the death of the foetus, if expression remain unavailing in engaging the head in the excavation, it is preferable to resort to perforation at once rather than to wait for a spontaneous diminution of the head under the influence of the uterine contractions, which is not always unattended with danger for the mother. Strassmann objects to the method of perforation indicated by Demmer,³¹⁷ which con-

sists in perforating with the aid of an instrument introduced into the mouth, two fingers being inserted into the buccal cavity to separate the jaws and hold the head steady. The author prefers, after having steadied the head by means of the index and middle fingers of the left hand placed in the mouth, sliding the perforator along the left hand, between it and the abdomen of the foetus, and pushing the cervical region at the base of the tongue into the curve of the lower jaw.

Charles, of Liège, ²⁵⁶_{Mar. 21, '76} in a case of retention of after-coming hydrocephalic head, passed his entire left hand up to the foetal cranium and then made an opening with Blot's perforator. The cerebral fluid, with pieces of brain-matter, soon came away; then two fingers were passed into the perforation, the head being gradually delivered.

Duncan D. Mackintosh, of Forres, N. B., ⁶_{Mar. 3, '76} gives an account of a personal case in which he resorted to the following procedure: Taking a stout piece of cord, it was doubled and the loop was passed through the mouth and out by the pharynx. The ends of the cord were taken outside the vagina and tied in a knot. Gentle traction was then applied by means of the cord, the fingers of the disengaged hand being meanwhile passed up to the sharp edges of the cervical vertebræ, thus protecting the maternal structures from being torn. The advantage of passing a cord through the mouth and out by the pharynx is apparent. Gentle traction, however, must be made, the danger being that the jaw may be torn off, especially when the foetus has been dead for some time.

Symphysiotomy.

Wm. J. Gow, of London, ¹⁵_{Aug. '76} expresses the opinion that the difficulties and dangers of symphysiotomy have been much exaggerated, and that it is probable that before long the value of the operation will be more fully recognized in England, where craniotomy or Cæsarian section is still preferred. The two chief obstacles to its popularity in that country have been (1) the supposed difficulty in performing the operation in the patient's own house and (2) the fear that the division of the symphysis may subsequently interfere with the patient's power of locomotion. Greater familiarity with the operation will do much, Gow believes, to dispel the former objection, and extended experience goes to show that the fear of bad after-results is unfounded. Fresh cases are constantly being reported, but the work of Pinard and his colleagues at the Clinique Baudelocque, ⁴⁶_{Aug. '76} is that which, perhaps, demands the greatest attention and respect. During the year 1894 2147 cases were

delivered at this hospital, and symphysiotomy was performed twenty-two times, with 3 maternal deaths. In 2 of the fatal cases death was attributed to septicæmia contracted before admission. In none of the cases was any special difficulty encountered nor any serious hæmorrhage or injury to the soft parts, although 13 of the patients were primiparæ. No unpleasant after-effects were noticed among the 19 women who recovered, and it is especially interesting to observe that in 1 of the cases the operation was performed for the second time. It must be borne in mind that at this institution symphysiotomy is systematically performed in all cases where the head is delayed from pelvic contraction, provided the contraction is not too great,—forceps, version, and craniotomy, as methods for effecting delivery in these cases, having been entirely abandoned. Pinard seeks to do away with the necessity of destroying infants to facilitate labor, and hopes to finally succeed in his endeavors by means of symphysiotomy.

An editorial writer ⁹_{Jan 2, 76} states that the most encouraging work in symphysiotomy in the United States has been that of New York City, where ten operators saved 19 out of 21 women and 18 of their children. One of the 2 deaths was unavoidable, the patient being *in extremis* when brought to the hospital; the other died of sepsis due to the operation. There have been eighty deliveries in North America, with 10 women lost, and of these 10 only 4 can be fairly charged against the operation *per se*. According to the author, the limit of symphysiotomy is very marked in the United States, and, as a rule, extends from a conjugate vera of $2\frac{1}{4}$ inches to one of $3\frac{1}{4}$ inches, when the pelvis is flat and the foetus of average size. But, in the justo-minor pelvis or when the foetus weighs from 9 to 12 pounds or more, the operation may be called for when the measure is $3\frac{1}{2}$, $3\frac{3}{4}$, or even 4 inches. The average weight of male children delivered under symphysiotomy in the United States has been found to be $8\frac{7}{16}$ pounds, and of females $8\frac{1}{8}$ pounds; so that it is folly to limit the conjugate to a measure below $2\frac{1}{4}$ inches if the child is to be delivered either by the forceps or by version without its death.

The report at a meeting of the New York County Medical Association of a successful case of symphysiotomy by Thomas R. Savage ⁹⁹_{May 1, 76} gave rise to an interesting discussion in which William T. Lusk called attention to the good work done of late in Paris, especially by Pinard. In 48 cases at the Hôpital Baudelocque there were 4 deaths; but, out of 44 cases in which the operation was performed under favorable conditions, there was but a single death. These 44 patients were women in good condition who were in the hospital before confinement. Out of 4 cases, how-

ever, in which the patients were sent into the hospital after being long in labor and already suffering from septic infection, no less than 3 died. The main danger in symphysiotomy had always been loss of blood, but the cause of fatal termination is too much delay in operating. If we could only be sure of our measurements of the pelvis and of the child's head, there is no good reason why it should not be done early in labor. At present, however, our measurements are very imperfectly made, and, if we find that the pelvis is not extremely contracted, we are apt to prolong our efforts to get the head through unnecessarily. In this way valuable time is lost and both mother and child are exposed to imminent risk. To avoid hæmorrhage the directions laid down by Pinard should be followed. With the index finger and thumb the clitoris should be seized and the suspensory ligament of the latter put upon the stretch and divided with the knife. Through the opening thus made the vessels could be pushed back with the finger placed behind the symphysis. Lusk then exhibited a metallic guard which was used for retracting the vessels and holding them out of harm's way.

Savage had stated that the common position of the joint was to the left of the median line. Lusk contended that in hundreds of dissections made in Paris the articulation was found in all in the median line. The reason why asphyxia of the child is so common after symphysiotomy he believed to be because in the United States and Germany no attempt is made by the operator to separate the ends of the pubic bones, which are left to be forced apart by the head of the foetus. It is no wonder, therefore, that asphyxia results from the great pressure thus caused. In Paris it is the practice to separate the bones at once by means of an instrument furnished with a graduated arc. The separation should be made precisely equal on both sides, for, if one of the bones yield and the other does not, irretrievable injury might be done to the joint. In case one of the bones should not yield, the process could be facilitated by abduction of the limb on that side. Savage had claimed that a separation of three inches, or even three and a half inches, could be safely accomplished. In France and Italy the separation is carried to two and a half inches, but never more.

If in delivering the child the forceps is applied, it is of the greatest importance to have the cervix fully dilated. As there is no anterior support, it requires great care to avoid making a rent in the soft parts. After the birth of the child the strong, fibrous tissues should be united by means of silk ligatures. In this way the most perfect union can be secured. At Baudelocque all the patients could hop on one foot a month after the operation, this

exercise being used as a test. In the United States, however, there is almost always imperfect union of the symphysis, and it is highly desirable that the method of holding the parts together should be improved.

[The statement that in the United States there is almost always imperfect union is not in accord with recent reports, which state that only exceptionally has motion at the symphysis been detected months after operation.—E. H. G.]

Tarnier, of Paris, ¹⁴_{Sept. 2, '96} states that after symphysiotomy, when the articulation is beginning to consolidate, the adhesions of recent formation may easily be broken. This proves the necessity of fixation apparatuses. He uses for this purpose a simple rubber belt covered with linen. This belt is passed under the loins of the patient and connected with ropes which cross above the bed, and pass over pulleys placed upon the frame of the bed in which the patient has been confined. By attaching more or less heavy weights to the free ends of the ropes the pressure upon the two iliac bones may be augmented or diminished at will. The belt also enables the patient to be lifted for toilet purposes.

M. Porak ²⁴_{Nov. 1, '96}; ¹⁵_{May, '96} advises that, before commencing the operation, the operator make sure that the pubic bones are movable, because in cases where the symphysis is ossified the sacro-iliac joints are nearly always immobile, and therefore division of the symphysis will be of no use. He recommends a semicircular incision four inches in length, parallel to the lower border of the pubes, and commencing just above the commissure of the labia majora. He claims that with this incision healing by first intention is more certainly obtained, and that hæmorrhage is more readily controlled. The central part of this incision, which is four inches in length, is opposite the middle of the pubic symphysis. The lower flap is dissected downward, keeping close to the bone, and all the structures attached to the lower border of the pubic arch are separated. Some hæmorrhage occurs from the venous plexus in connection with the corpora cavernosa of the clitoris, but this is easily checked by pressure with cotton-wool tampons, as the wound is still superficial and possesses a resistant base. The symphysis is divided from below upward with a bistoury guided by the finger, and no further bleeding follows the separation of the symphysis. When, however, a vertical incision is employed and the symphysis is divided from above downward, free bleeding sometimes follows the separation of the pubic bones, and this is due to the corpora cavernosa being torn at the moment of separation. Porak points out that, with a deep wound and no firm base against which to apply pressure, it is often difficult to

check the bleeding. During extraction of the head the anterior vaginal wall may be extensively torn; and this constitutes a serious danger, especially in primiparæ. This accident is occasionally associated with free hæmorrhage, and the tear is generally situated to one or other side of the urethra and bladder. A tear of this kind occurred in Porak's cases.

M. L. Harris, of Chicago, ²⁷_{Dec., '94} recently proposed what he regards as a most important improvement in the technique. The chief source of the bad results of pubic section is the laceration of the soft parts which occurs on separation of the bones. The deep layer of the deep perineal fascia, by reason of its attachment to the pubic rami, is necessarily subjected to strain on separating the bones and is more or less extensively torn. It is the tearing of this fascia and of important structures which pass through it which gives rise to most of the dangers and complications of the operation,—hæmorrhage, sepsis, urinary fistula, incontinence of urine, etc. The hæmorrhage is often particularly troublesome and dangerous, sometimes fatal. Schwartz says the veins are held open by the intervening fibres of the deep fascia. The improvement alluded to is this: after division of the joint and before separating the bones Harris detaches with a blunt-pointed bistoury the ligamentum arcuatum and deep fascia from the bone on each side sufficiently to allow the symphysis to separate to the extent of about six centimetres. Under this method hæmorrhage, vesical, urethral, and vaginal injuries, and, in fact, all the more dangerous complications of the operation are, he says, easily and completely obviated.

Braithwaite, of London, ⁶_{June 8, '96} states that the way to avoid hæmorrhage is to gently, but freely, separate the soft parts behind the symphysis before dividing it, by which plan the stretching of the soft parts is lessened in amount and distributed over a larger area. It would also be a good plan to put a few turns of bandage round the hips,—not tightly,—so as to prevent the separation of the symphysis occurring too suddenly. The operation is extremely easy if there is a suitable knife, but on an emergency, in a country-practice, a sharp penknife would do. It is well to keep close to the bone, so as to avoid wounding the bladder.

Queirel, of Marseilles, ¹⁴_{Apr. 22, '96} has examined 158 female pelves, and has never found the pubic symphysis ossified. Twenty-three times it showed a deviation to the left, eighteen times to the right. He is, therefore, inclined to suppose that, in the cases in which it was necessary to use the chain-saw to cut the symphysis, either its true position was not recognized or it presented a somewhat abnormal disposition. Thus, in one instance, not being able to

sever the symphysis from the top downward, he was able to accomplish it by passing the bistoury from below upward. Sometimes the interarticular line is very fine and narrow. Fochier considers that it is advisable not to generalize too much, and that, although among the 158 pelves referred to by Queirel there was no ossified symphysis found, others have, nevertheless, met with them. Budin agrees with this opinion.

Friedrich Schwartz¹⁵⁷ Aug. 78 concludes, from an experience of five operations, that symphysiotomy is suited to pelves which are flat, generally contracted, or rachitic, with a conjugate between 7 and 9 centimetres ($2\frac{3}{4}$ and $3\frac{1}{2}$ inches), provided the pubic separation on delivery need not exceed 7 centimetres ($2\frac{3}{4}$ inches). If there be reason to fear injuries to the soft parts, the Cæsarian operation is preferable. Symphysiotomy cannot replace artificial labor. It is destined to replace embryotomy and perforation of living children. It replaces Cæsarian section in pelves of more than 6 centimetres ($2\frac{3}{4}$ inches), conjugate vera, when complications have arisen which do not permit of doing, with a prospect of success, either the conservative Cæsarian section or the Porro operation.

E. P. Davis, of Philadelphia,⁵⁰ Aug. 10, 78 basing his opinion upon five personal cases, stated that he considered the operation as a child-saving one. Two of the cases led him to believe that symphysiotomy was most successful in women not weakened by prolonged labor, in whom there was slight contraction of the pelvis, no great disproportion between the pelvis and head, and in women in whom the vagina and vulva were well developed and distensible. The Säger operation was indicated where there was marked disproportion between the head and pelvis, as shown by the failure of the head to engage; where the vagina was poorly developed, and in married women who were willing to run the risk of a future pregnancy. Where, as in his case, the patient had a poor constitution and was liable again to pregnancy, he would advise cœliotomy followed by hysterectomy.

Tarnier¹¹⁵³ July 22, 78 compares the results obtained from symphysiotomy with those shown by induced labor. In pelves whose antero-posterior diameter ranges from $6\frac{1}{10}$ centimetres to $8\frac{1}{10}$ centimetres ($2\frac{1}{8}$ to $3\frac{1}{8}$ inches), in 30 cases he had no maternal mortality from induced labor, but 40 per cent. infantile death-rate. In 49 cases in which the same diameter measured from $8\frac{1}{10}$ to $9\frac{1}{10}$ centimetres there was no maternal mortality, with $20\frac{2}{10}$ per cent. infantile mortality. In his third series of 17 cases, in pelves whose antero-posterior diameter measured from $9\frac{1}{10}$ to 11 centimetres, he had no maternal mortality, but an infantile death-rate of $29\frac{4}{10}$ per cent. He calls attention to the fact that the

mortality-rate of children is less in the middle range of pelvic contraction, because pregnancy is interrupted in these cases after the end of the eighth month, at a time when the foetus is still comparatively small. The high mortality among children in the third series of larger pelves occurs because these patients call aid too late, when the child has become too large to pass favorably through the pelvis. In cases in which interference is practiced most often—namely, those in which the antero-posterior diameter of the pelvis is between $8\frac{6}{10}$ and $9\frac{6}{10}$ centimetres—the total mortality-rate of mothers and children in 200 cases was $20\frac{29}{100}$ per cent., while the best statistics of symphysiotomy give a mortality-rate of mothers and children of 33 for 200 cases. Pinard's statistics give a total of $18\frac{36}{100}$ per cent. mortality-rate for 200 cases after symphysiotomy. The difference, however, between the results of induced labor and those of symphysiotomy does not serve, therefore, to recommend the latter operation.

Tarnier believes that induced labor will be the operation chosen in pelves whose antero-posterior diameter is more than 8 centimetres ($3\frac{2}{8}$ inches), and that symphysiotomy should be selected in appropriate cases with an antero-posterior diameter less than 8 centimetres ($3\frac{2}{8}$ inches). If the statistics for induced labor are taken for cases divided into two classes in this way, it is found that in pelves above 8 centimetres there was no maternal mortality and an infantile death-rate of $24\frac{77}{100}$ per cent. In pelves below 8 centimetres, with no maternal death-rate, the infantile mortality was $57\frac{14}{100}$ per cent.

R. Braun von Fernwald, ³¹⁷_{Aug. 14, '96} ⁴⁹_{Nov., '94}, in commenting upon the permanent results of symphysiotomy, states that of 12 cases operated upon by him 4 ended fatally from septicæmia. These had possibly been tainted before coming to the hospital. The subjective symptoms were in all cases good, whether wire suture for the bone (3 cases) or periosteal sutures were used; only in 2 cases were there pains on getting up or lifting heavy burdens. The gait was in all cases good. Mobility at the symphysis in 2 cases might have been due to subsequent pregnancies.

Queirel, ³_{Aug. 14, '96}, out of 2000 confinements, had had occasion to resort to symphysiotomy thirteen times, and had never noticed the slightest relaxation of the pubis. The only complications which he encountered were certain symptoms in the urinary tract, but the consolidation of the pubis was never interfered with. He adds that the maternal mortality was *nil*, while that of the infants was 10; 2 of the children were already dead before the confinement.

Binaud ⁸²⁷_{Nov. 14, '96} reports a case of mobility of the pubic joint following symphysiotomy treated by suture of the bones. The peri-

osteum and fibrous tissue were detached from the anterior surface of the pubic bones for five or six millimetres; the bones were then perforated with a fine trephine, and while pressure brought the two surfaces together they were wired in that position with silver wire. The hips were tightly bandaged and a catheter placed in the bladder. The result was excellent, the patient being able to walk without fatigue.

G. A. B. Addy, of St. John, N. B., ²⁸⁴Mar., '96 reports a case in which the child lived and the mother did well until the third day, when she died with symptoms of intestinal obstruction. An autopsy showed that death was due to constriction of the bowels by a firm, fibrous band at the junction of the cæcum and colon. Guéniot ³¹May 1, '96 performed symphysiotomy twice on the same subject.

Olshausen ³¹⁷Sept., '94; ¹⁵⁷Aug., '96 shares, in the main, the opinion of Leopold on the indications for symphysiotomy. At the same time he thinks the Cæsarian operation deserves more consideration. Sän-ger's mortality in twenty Cæsarian sections was about 14 per cent. This figure differs somewhat from that mentioned by Leopold—15 per cent. to 20 per cent.—and is but little greater than that of symphysiotomy, which is 12 per cent.

John G. Cecil ²²⁴Aug. 24, '96 considers that craniotomy, in the light of modern surgical achievements, is not indicated upon the living child, although it may be used for monstrosities and hydrocephalic and dead infants, but even then not in extreme narrowing of the pelvic canals. Symphysiotomy is a perfectly justifiable operation, which finds its ideal indication in the pelvis æquabiliter justominor. With regard to certain of the cases in which Cæsarian section may be employed, the author thinks that, considering the frightful foetal mortality and the great risk to the life of the mother, placenta prævia centralis also constitutes a legitimate indication for this operation.

An excellent review of symphysiotomy *versus* embryotomy upon the living foetus was read before the Cincinnati Academy of Medicine by E. Gustav Zinke. ⁴²⁸Apr., May, June, '96

Cæsarian Section.

George Haven, ⁹⁹Feb. 21, '96 in a paper giving the report of a case under his care, stated that he had collected 40 cases operated upon in the United States since 1888. Of these 9 died,—a mortality of 22½ per cent. Of the 9 deaths 1 case was operated upon without any antiseptic precautions; 1 had been in labor six days and had had forceps and version tried; another had advanced malignant disease and was dying at the time of operation; still another had been in labor two days and had had forceps and version; this is

also true of a fifth, while the sixth death was in a case in which labor had lasted five days and where the woman was septic. These cases should not properly be counted. If they be omitted there were 3 deaths in 34 cases, or a death-rate of between 8 and 9 per cent. It is also interesting to note that all cases operated upon in hospitals recovered save one, and this was the case of advanced malignant disease. He thinks it can be assumed that, in all properly-selected cases, the mortality is not greater than 9 per cent., and that, in cases operated upon at the time of election, in hospitals, the mortality will be very much below 9 per cent. We then have Cæsarian section with a mortality of 9 per cent., craniotomy with a mortality of 5 per cent., and induced labor with a mortality of 5 per cent.; in other words, Cæsarian section is, taking all cases, nearly twice as dangerous for the mother as craniotomy or induced labor. Undertaken in proper surroundings and by skilled operators, he doubts very much whether the maternal mortality is greater than in craniotomy, and the foetal mortality is, of course, considerably less.

Demelin, of Paris, ¹⁴_{Apr. 22, '96} compared the results of Cæsarian section with those of Porro's operation, based upon 164 cases of Cæsarian section collected by him, in which there was a mortality of 22 per cent. for the mothers and 2 per cent. for the children. Porro's operation gives 25 per cent. mortality for the mothers and 50 per cent. for the children, in 55 cases. Taking only those cases since 1893, the maternal death-rate is 16 per cent. for Cæsarian section and 10 per cent. for Porro's operation. The maternal and foetal prognosis is improving, but the latter remains much worse in the Porro operation, in the proportion of nearly 2 to 1. It may be said that the general cause of death in the latter is septic infection. The best time to perform Cæsarian section is just before or just after the commencement of labor, and if the membranes have not ruptured it is especially favorable. Rapidity in operation is of the greatest importance; he quotes Kelly, among others, as especially insisting upon this point. The time consumed should not exceed one-half or three-fourths of an hour.

Dolder ⁴⁰⁴_{No. 39, '91}, ⁴⁹_{Nov., '96} compares Cæsarian section with perforation, and argues that it can be done without any help, while in Cæsarian section three skilled assistants are required and in country-practice are not easily found. After perforation, under proper indications and such strict antisepsis as every practitioner may and should secure, the course of childbed is normal and requires no extraordinary care, but the success of Cæsarian section is often imperiled by the want of expert nursing.

Statistics are given showing that the mortality after perforation

is 6.6 per cent. in hospital and 10.937 to 6.66 per cent. in country-practice, and that after Cæsarian section it is 12.94 to 6.0 per cent. for the mother in hospital and 6.8 per cent. for the child; compared with a mortality in country-practice, unknown as regards the child, but over 50 per cent. for the mother. The author therefore concludes that Cæsarian section is an operation for hospitals and town-practice, while under similar indications perforation must always play an important part in country-practice,

At a meeting of the French Obstetrical Society, Tarnier, of Paris, ¹⁴_{Apr. 25, '96} gave the history of five cases of Cæsarian section performed by him within the last twelve months. Instead of incising the uterus layer by layer, he is in the habit of making a button-hole at first with the bistoury, and then completing the section with the scissors. After extraction of the fœtus he invariably injects a dose of ergotine subcutaneously and renews the dressing of the abdominal wound as rarely as possible.

PUERPERAL DISEASES.

Puerperal Involution.

Keiffer, of Brussels, ¹¹⁶⁰_{June 12, '96} attaches supreme importance to incomplete uterine involution after labor as a cause of many disorders of the genital apparatus. He attributes subinvolution to three causes: (1) frequent antiseptic injections; (2) the abdominal bandage; (3) too early getting up and the fatigue incident upon the resumption of daily duties. Charles, of Liège, ¹¹⁶⁰_{June 12, '96} on the other hand, approves of patients getting up for a couple of hours daily to recline on an easy-chair or sofa, finding that involution is thus favored. The latter believes that at least six weeks should elapse before active occupations are resumed.

C. K. Broers ²¹⁶¹_{'96} considered the subject of puerperal involution of the uterine muscles, basing his conclusions on careful study of the rabbit at various parts of the post-partum period. He expressed the opinion that at the beginning of the puerperium the diminution in size of the uterine muscle is to be attributed to a glycogenic effusion of the hypertrophied muscular fibres, with a resorption of the œdematous intermuscular fibrous tissue. Probably the glycogen, having undergone a chemical modification, is transported by the lymphatics. This effusion of glycogen, which begins in the first hours after delivery, is the sole factor in the diminution of the musculature,—a diminution which follows a progressive course until the end of the first day, when a new factor is added. Small fat-globules collect in the muscular cells, and

little by little increase in size and become confluent. They leave the cells and are temporarily deposited in the intermuscular fibres, to be finally expelled on the fifth day. Their expulsion causes a considerable decrease in the size of the muscles, which by the end of a week and a half have reached the average normal dimensions. The process in no way implies a destruction of the muscular fibre, the fat which is formed being transported by the lymphatics and vessels so slowly that at the end of nearly five weeks it has not entirely disappeared. The same process also goes on in the coats of the arteries, the lumen of which sometimes undergoes considerable contraction,—so much so that an artery may sometimes be entirely closed from proliferation of its internal coat. (Report of Corresponding Editor Mijnlief, of Breukelen, Holland.)

Puerperal Fever.

Some time ago Budin called attention to the intestinal symptoms which sometimes present themselves after parturition, and which may give rise to symptoms clinically analogous to those of puerperal infection, but which, when recognized and treated in time, are almost always readily cured. Michel Barbier ²¹²_{Jan 10, '98} has collected several cases of this kind and demonstrates the importance, for the patient, of not confounding them with true puerperal septicæmia. The latter, it is well known, is most frequently due to the invasion of the placental wound by the streptococcus; other microbes, however, such as the staphylococcus, the septic vibrio, and particularly the coli bacillus, may be the cause. The infection produced by the latter organism is sometimes localized in the intestine and sometimes generalized, in which case the coli bacillus passes from the large intestine into the uterus and its appendages and causes uterine symptoms identical with those observed after direct infection by the streptococcus. Accidents of this kind are generally produced in constipated women, in whom the intestine is dilated, and usually occur several days after confinement.

These facts indicate that it is necessary to carefully watch the intestinal functions, particularly in the latter period of pregnancy. If infection has already been produced, the vagina should be carefully disinfected, and vaginal injections of 1 to 1000 solution of corrosive sublimate should be given morning and evening. A small quantity of iodoform gauze should be placed in the vagina and the vulvar and perineal wounds carefully dressed. If uterine involution does not take place promptly, or if proper precautions have not been exercised during delivery, it would be advisable to disinfect and cleanse the uterine cavity.

In referring to puerperal fever Rapin ¹⁹⁷_{Oct. 20, '95}, ²_{Dec. 26} states that the fever is due to intoxication, not infection. Toxins develop in the inflamed mucosa and pass into the blood. Microbes, Rapin insists, may enter the blood, but they are destroyed by phagocytosis or by the bactericide action of the blood in this form of fever. Thus, chronic puerperal fever "without localization" is really chronic, septic, puerperal endometritis, the general rapidly replacing the local symptoms. The importance of the early use of the curette becomes evident.

J. M. Baldy ²⁷_{July, '95} distinguishes between cases in which there is suppuration and cases where there is infection of the Fallopian tube, the ovary, and possibly of the peritoneum, without any formation of pus, but with exudation recognizable by physical examination. He cites a case as an example of the former class, in which the uterus was subinvolved; to the left side of it could be felt a large, boggy mass, firmly adherent, tortuous, and tender. An abdominal section was performed, and the swelling, which proved to be the left Fallopian tube and ovary distended with pus, was removed, the patient making a rapid recovery.

A. Lapthorn Smith, of Montreal, Canada, ²³_{Jan., '95} insists upon the evil influence of sewer-gas, and declares that he "would much rather do a cœliotomy in a wood-shed or a hovel where there was no sewer or plumbing of any kind than in the finest hospital operating-room or private house where there was a direct connection with the sewers of a great city, owing to a defect in the plumbing or the syphonage of a trap."

M. Handfield-Jones, of London, ¹⁰⁷⁷_{Oct. 1, '91}, ⁸⁷³_{Jan., '95} in commenting upon blood-poisoning and sewer-gas, says that in a given case of puerperal blood-poisoning the following points may aid in establishing the influence of drain-products: 1. The rapid onset of symptoms after delivery. 2. The illness of the child as well as the mother; the improvement following a change of locality. 3. The type of the disease,—absence of intense prostration, the slow progress, only partial cessation of milk and lochia, rareness of peritonitis, and remissions of temperature. 4. Other cases of illness of a low type in the same house or neighborhood.

Treatment.—Experiments with serum-therapy in the treatment of puerperal fever are reported by Charrin and Roger. ⁹²⁷_{Feb. 21, '95} Nissen in 1889 demonstrated that the bacteria of anthrax did not develop well in the serum of vaccinated subjects. The authors then showed (1889) that the serum of vaccinated animals had the triple property of retarding the development of bacteria, of modifying their forms, disturbing their functions, and, finally, of depriving the microbes of their virulence (1890). The serum of

animals vaccinated against the streptococcus may alternate the virus and prevent its development in the rabbit (Roger, 1892; Mironeff, 1893). The authors immunized a mule by 8 injections of 30 cubic centimetres of culture sterilized in four months. They then collected the serum of the injection and injected the same in a patient suffering from puerperal fever. The woman recovered.

In a case reported by Josué and Hermary⁹²⁷ there was a rapid amelioration of the general condition, and the local symptoms improved two days later. Recovery followed. In another treated by Jacquot¹¹⁵³ after 3 injections of antistreptococcous serum (30 cubic centimetres—1 fluidounce) the patient seemed well. Three days later her mother contracted facial erysipelas, and two days afterward the patient had a severe rigor and the temperature again rose to 40° C. (104° F.). One injection of serum arrested the progress, and there was no relapse. Jacquot remarks that this case, while showing the favorable action of the serum in puerperal septicæmia, and notably on the temperature, further illustrates the reciprocal relationship which exists between this disease and erysipelas.

Roger, of Paris,⁶⁷⁸ also related some cases of puerperal fever and erysipelas treated by the injection of an antistreptococcous serum. The first case, a severe one, was cured in forty-eight hours. Several others also resulted in recovery.

Gaulard, of Lille,¹¹⁵³ reports two cases in which serum-therapy was resorted to. In the first a complete success resulted, which the author ascribes mainly to the use of the serum. The second case ended in death, but the temperature ran a singular course. The author had never before seen a puerperal patient die in this way in complete defervescence. He considers it rational to always precede the use of the serum by a thorough cleansing of the uterine cavity. Under these conditions it may render genuine service.

Bayard Holmes, of Chicago,¹ gave his views as to the indications of hysterectomy in puerperal fever, which still causes almost one-half of the deaths that occur during the puerperal state. Puerperal sepsis has its origin in the endometrium, and usually travels by the lymph-channels or by the thrombotic blood-vessels and the lymph-channels together. He considers that curetting is ineffectual in many cases, while the removal of an infected broad ligament and the drainage of a pelvic abscess or peritonitis is often ineffectual. Hysterectomy should, therefore, be performed (1) in such cases of puerperal infection as do not yield to uterine curetting and irrigation, (2) whenever peritonitis is present in the course of puerperal fever, and (3) when there is a history of endometritis

without uræmia. The operation may not be helpful, however, in the course of diphtheritic elytritis and endometritis, in cases of rapid early infection, nor in cases of septic phlebitis reaching outside of the pelvis.

Baldy, of Philadelphia, ⁶_{Aug. 17, '95} has collected 19 cases of hysterectomy during the puerperal state performed by American operators. Twelve of the patients died and 7 recovered. Baldy thinks sufficient success has been obtained to warrant a further and more general trial of abdominal hysterectomy in the special class of cases under consideration, though he admits that the field for hysterectomy in puerperal cases is not a large one.

From an experience of 7 operations, with 4 deaths and 3 recoveries, Barton C. Hirst, of Philadelphia, ²⁷_{June, '95} ⁶⁷⁸_{Aug.} is strongly disposed to decline to perform hysterectomy in septic infection after labor unless there is evidence of the inflammation having extended to pelvic structures beyond the womb, fixation of the latter, and the development of inflammatory masses around it. There is not sufficient justification for operation in the first twenty-four hours, and after that it is too late.

W. Easterly Ashton, of Philadelphia, ¹²¹_{Jan., '96} considers that the conditions indicating hysterectomy for puerperal septicæmia are: (1) suppurative inflammations of the uterus, (2) tubal and ovarian abscesses, (3) abscesses of the broad ligament, and (4) rupture of the uterus.

Pryor ²⁷_{July, '95} showed the New York Obstetrical Society two uteri from cases of puerperal septicæmia without peritonitis,—one removed at autopsy after Cæsarian section by Edgar, the other removed by himself by abdominal hysterectomy. These made seven cases altogether seen by him of puerperal sepsis without any lymph in the peritoneum and with normal tubes in which the patients had died or would have died without operation. The other five had occurred in the practice of other physicians.

A. F. Currier, of New York, ⁵⁹_{Feb. 8, '95} remarking upon saturation of the uterus with septic matter, expressed himself against extirpation of the organ. The patient's powers are already too severely taxed to withstand the shock of this major operation.

In commenting upon the use of the curette in puerperal infection Ferré ¹⁶²_{Nov. 25, '94} strongly supports this practice after long experience of irrigation of the uterine cavity for puerperal infection,—a procedure which lowered mortality, but did not save several bad cases. At the same time, he never had recourse to the curette after labor excepting when placental remnants required removal. Since using the curette six bad cases have been treated by Ferré, with only one death.

According to Demelin,²³⁶_{Mar., '96} the chief indication is infection ; but, in addition to cases of infective endometritis, he recommends curettage in cases where a portion of placenta is retained and has begun to undergo decomposition. He also asserts that in febrile conditions associated with retention of a thickened and hypertrophied decidua the curette should be used if the fever does not yield in three or four days to uterine irrigation.

Perrin²³⁶_{Mar., '96} describes fourteen cases treated in this manner by Auvard with the object of demonstrating that curettage of the uterus is the most certain means of rapidly obtaining a fall of temperature. He confesses that the fall of temperature is not immediate, and that usually on the first night after the operation the temperature is higher than before ; but he says that on the next day, though sometimes not for two or three days, the fever disappears. The majority of the cases alluded to, however, are cases of fever arising after abortion, and not after full-term delivery.

In an article on reproduction of the uterine mucous membrane after curetting, L. M. Bossi⁹⁴³_{Feb., '96} considers that in most cases it is probable that the mucous membrane is only imperfectly removed,—a fact which, perhaps, explains the tendency to the recurrence of local pathological conditions.

Alexander Duke, of Cheltenham,²²_{Sept. 25, '96} states that he prefers to have recourse to curetting rather than rely on the old treatment by drugs, which may be very useful in conjunction, but too often prove useless alone. He thinks that an antiseptic treatment in midwifery would be seldom required if the aseptic were more attended to, one of the most important plans being thorough flushing of the entire genital tract directly after labor. Those who have not taken the trouble on themselves to thoroughly wash out the uterine cavity directly after labor—the time when it can be best and easiest accomplished—can have little idea of the amount of *débris* which, if left behind, must take a considerable time to be expelled and is certainly likely, to say the least, to prove a source of danger to the lying-in patient.

J. A. Ten Bokkel Huinink^{790, 112}_{V. 4, '96 ; Sept.} describes the method pursued by Van der Mey, of Amsterdam. Whenever fever, during puerperal state, can only be attributed to infection of the general tract, a most careful examination is made. If any ulceration due to a puerperal lesion is found, disinfection with sublimate solution is first resorted to, and the vulva and vagina are then painted with tincture of iodine. If, after this, the temperature does not decrease, the cavity of the uterus and the cervical canal, after having been thoroughly disinfected with a solution of corrosive sublimate or

carbolic-acid solution, are swabbed out with the tincture of iodine. Fifty-two cases from Van der Mey's clinic show that this treatment, if not unduly delayed after the appearance of the fever, will arrest its development.

Tarnier ²⁴_{Jan. 1, '96} also advocates intra-uterine injections of iodine. If the temperature does not fall he first resorts to simple swabbing out of the uterus, then to the curette. As much nourishment as possible, with alcoholic drinks, is given, with quinine, 1 gramme (15½ grains) in two doses, morning and evening, increasing to 1.50 grammes (23½ grains), but not exceeding 2 grammes (31 grains) in twenty-four hours. Cold ablutions; wet cloths on the head, stomach, and thighs; wet packs, or cold baths, are the adjunct measures employed. When temperature exceeds 38.5° C. (101.4° F.), no cold baths are given.

Switalsky, of Krakow, Russia, ⁵⁸⁶_{No. 91, '96} ¹⁴_{Jan. 19, '96} cites three cases of puerperal fever successfully treated by Fochier's method. In each case 2 cubic centimetres (½ drachm) of essence of turpentine were injected into the thigh. As the injection of the full amount of 2 grammes at one time is very painful during the first few hours, the author advises that Fochier's procedure should be followed, and two injections of 1 cubic centimetre be given,—one in the deltoid region and the other at the nape of the neck.

Egbert H. Grandin, ⁵_{July, '96} in an article on late infection in the puerperal state, read before the American Gynæcological Society, May, 1895, presents a plea in favor of manual examination of the interior of the uterus after the completion of labor, as a routine procedure. The sole objection which may be offered is the fact that it is necessary to insert the hand into the parturient canal after the third stage of labor has been supposedly completed. The aseptically clean hand inserted into the uterus, under conditions when access to its interior is unimpeded, does not, he thinks, carry risk to the woman comparable to those to which she may become subjected if the uterus has not been cleansed of all remnants.

Puerperal Eclampsia.

Geuer, ³¹⁷_{No. 2, '96} in a report of the cases of puerperal eclampsia occurring in the Cologne Maternity, states that in 5000 labors there had been 50 cases of eclampsia, 42 of which were in primiparæ. In 5 cases there was twin labor. The eclampsia appeared in 6 cases during pregnancy, in 7 not till childbed, and in 37 during labor; 3 out of the 6 cases where the convulsions occurred during pregnancy passed through normal labor and childbed, in the fourth convulsions occurred during birth, in the fifth during childbed as well. The convulsions ceased entirely after delivery

in 18 cases and steadily diminished in 10. Twelve mothers died, —10 from eclampsia, 1 from nephritis, and 1 from sepsis.

Clement²⁰⁰⁰ has studied the relation of twin pregnancy and puerperal eclampsia, and states that in single pregnancies the frequency of eclampsia is 1 in 350, while in twin pregnancies it is 1 in 15.5. It is also more serious for the maternal prognosis, which furnishes 7 deaths in 15 cases, than for that of the foetus, which gives 10 deaths against 16 living children and 4 cases in which the results were not indicated. According to Tarnier, the maternal mortality in eclampsia is 30 per cent. and the foetal mortality 46.6 per cent.

D. G. Simmons, of Adairville, Ky.,⁵¹⁹ in reporting four cases of puerperal eclampsia with uræmia, concludes that corpulent women are more subject to the condition than others, that mechanical pressure from the growing uterus embarrasses the functions of the kidneys and uterus, causing albuminuria where it had not previously existed and aggravating it in cases in which it was present. The thickness of the abdominal walls in fleshy women diminishes the abdominal capacity and increases the amount of pressure.

Edward P. Davis, of Philadelphia,⁸⁰ and several other authors have, during the year, expressed their concordance with the view that eclampsia is the result of a complex irritant poison, which is produced not only by failure of excretion by the kidneys, but also by failure in the action of the liver, the skin, the lungs, and the intestines.

John Williams¹⁵ draws attention to the fact that renal disease is not the sole cause of puerperal eclampsia. In the first place, convulsions may occur in the absence of albumin in the urine, while in many fatal cases of eclamptic convulsions disease of the kidneys is absent or insignificant, and puerperal convulsions are comparatively rare in persons the subjects of chronic Bright's disease prior to the occurrence of pregnancy. The author describes two cases of convulsions, associated with albuminuria, in which the albuminuria was not the whole of the disease nor the whole of the condition giving rise to the convulsions. In one of the cases an analysis of the symptoms confirmed the belief that an irritant poison had given rise to severe arterial tension and albuminuria,—i.e., a severe contamination of the blood, resulting in damage to the organs of excretion.

Interesting in this connection is a paper by A. Favre,²⁰ in which he reports a death from eclampsia, found post-mortem to have been caused by a parametric stricture of one ureter, and the results of experiments having for their object to determine the rela-

tion between acute parenchymatous nephritis and such diseases as puerperal eclampsia, ptomainæmia, etc. Of the experiments on live rabbits, the most important was to tie the renal vein on one side and observe the effects. From the results noted he concludes (1) that retention of urine, aided by an infection of the blood, can easily cause a partial or total parenchymatous nephritis and (2) that a large number of micro-organisms, when present in the parenchyma of the kidney, can also produce a parenchymatous nephritis.

An interesting contribution to the literature of this subject is that of Massein, of St. Petersburg.³¹⁷ No. 47, '96 who found by means of careful experimental study that the body of the pregnant woman, and especially at the end of pregnancy, contains an abundance of partially-oxidized products, or leucomaines, which are usually transformed and excreted by the liver and kidneys. Where, however, these organs are at fault, the toxins or, at least, a large proportion of them remain in the body of the patient and form the basis of the disease, their absorption being favored by abnormal condition of the parturient's nervous system.

Concerning the toxicity of the serum of eclamptic patients, Ludwig and Savor¹¹⁹⁰ v. 1, No. 5, '96 observed, by experiments upon animals, that the toxicity of the urine varies greatly from time to time. Contrary to what might be expected, during convulsions the toxicity of the urine is much less than at other times. This points clearly to the fact that retained toxins are the cause of eclampsia. They certainly point most strongly to the great indication for treatment in these cases,—namely, the prompt promotion of elimination in every possible way.

Cassaet and Chambrelent¹⁴⁸ Oct. 25, '96, ⁴⁵¹ Jan., '96 studied histologically the kidneys and spleen of still-born infants of eclamptics and of children born of eclamptics who died soon after birth. Death was found to be due to two very different causes: 1. To hæmorrhagic and degenerative lesions of the placenta; in these cases the fœtus died *in utero* and was often macerated at birth. 2. To histological alterations of the spleen and kidneys, resembling the lesions found in the organs of the mother. These lesions explain the great mortality in the infants of eclamptics, even when they are born living and well developed.

Abelin¹⁸⁸ Nov. 17, '96 reports a case of puerperal eclampsia with subsequent tetanus due to biting of the tongue.

An interesting case of eclampsia in mother and child is reported from Schauta's clinic in Vienna by Woyer.⁸¹⁷ No. 18, '96 The patient was a primipara, and was admitted to the hospital partially comatose and suffering from eclamptic convulsions. Five hours

after birth the child was taken with eclampsia, and, in all, had four convulsions at intervals of an hour or two, followed by recovery. The few cases of infantile eclampsia on record have ended fatally.

Treatment.—Zweifel³¹⁷_{Nov. 44-46, '96} reviewed the results in 129 cases treated in the Leipzig clinic. Of this number 49 were treated on the expectant plan and 80 actively on Dührssen's principle of emptying the uterus as soon as possible. The mortality among the former was 32.6 per cent., while in the latter it was only 15 per cent. Any error is recorded to the disadvantage of the active treatment. Zweifel concludes by advocating the principle of immediate delivery by operation in every case of eclampsia, by dilatation with elastic bags, and, when the cervix is already involved, slight incisions into the os or, in cases not so far advanced, by making more extensive incisions into the cervix. The author does not think ether contra-indicated as an anæsthetic; either it or chloroform may be employed. Finally, he insists that a rigid asepsis is the more necessary, as infection favors the recurrence of the convulsions.

Charles Clifford Barrows¹_{Nov. 23, '96} reported two cases of puerperal eclampsia successfully treated by Dührssen's incisions and veratrum viride. In the discussion J. Clifton Edgar praised the latter drug, and W. J. Chandler, of South Orange, N. J., said that it had been a common treatment in the Orange Memorial Hospital. The drug was very satisfactory and free diaphoresis is induced.

In a paper on the treatment of puerperal eclampsia, read at the American Gynæcological Society, Thaddeus A. Reamy, of Cincinnati,¹⁹⁶_{Sept., '96} related several cases of puerperal eclampsia treated successfully by large doses of Norwood's tincture of veratrum viride or by this agent combined with morphine. Most of the patients had been treated unsuccessfully by other means before he was called. The promptness with which the convulsions had been arrested as soon as the veratrum viride had had time to act upon the heart and vasomotor system was quite noticeable. Other papers in praise of this drug were published by Harrison,²⁷_{Sept., '96} C. M. Hyde, of Augusta, Miss.,⁹_{'96} and F. B. Hamilton, of Jackson, Tenn.,¹⁹_{Sept. 14, '96}

Richard C. Newton, of Montclair, N. J.,¹_{Dec. 14, '96} describes the treatment of eclampsia employed by Love, of Montclair, in twenty-four cases, none of which he lost. The author adds two of his own. Love gives veratrum viride by the mouth or hypodermatically until the pulse is brought below 60 and the convulsions are controlled. He then administers the following benzoic-acid mixture:—

R	Acidi benzoici,	2 drachms	(8 grammes).
	Potass. bicarb.,	$\frac{1}{2}$ ounce	(16 grammes).
	Spirit. æther. nit.,	1 fluidounce	(31 grammes).
	Spirit. Mindereri,	2 fluidounces	(62 grammes).
	Syr. limonis,	q. s. ad 6 fluidounces	(186 grammes).

M. Sig. : A tablespoonful every four hours.

A point upon which Love insists, and which is contrary to the prevailing ideas, is absolute non-interference with the contents of the uterus, concluding that the strain thus imposed upon the patient affords unjustifiable and needless risk. In certain cases he would not hesitate to bleed, but considers this manœuvre, as a rule, quite unnecessary. For the immediate control of the spasms he uses chloroform.

B. Grünberg⁵³⁰_{Nov. 3, '96} reports that he employed hypodermatic injections of pilocarpine in four cases of eclampsia, giving 0.01 gramme ($\frac{1}{8}$ grain) at a dose. One of the cases died of pulmonary œdema. In the other cases the convulsions were stopped quickly and permanently. Pilocarpine is contra-indicated in all cases complicated by pulmonary trouble. The case that died was found to be suffering from pulmonary tuberculosis.

Still-births.

Féré⁹²⁷_{Jan. 13, '96} comments upon the persistence of the heart-movements after the death of the embryo, and states that during his teratogenic researches he was surprised to find that the heart continued to beat in very young embryos which were monstrosities and sometimes even reduced to a cyst or an accumulation of granulation. In the embryos of monsters the heart often beats quicker than in normal ones. In older embryos he has seen the heart continue to beat a long time after the death of the embryo, indicated by the complete opaqueness of the tissues. When the death of the embryo is artificially induced by coagulation of the tissues by means of a high temperature, the heart will be seen to beat for a long while after the complete coagulation of the body of the embryo.

At a meeting of the Académie de Médecine of Paris Laborde¹⁴_{Feb. 20, '96} reported a new case of resuscitation by rhythmic traction of the tongue, and stated that on physiological principles he considered this method as decidedly superior to the other processes for artificial respiration, particularly that of insufflation. Tarnier referred to the fact that Laborde had advanced the opinion that insufflation was dangerous, and that poisoning of the child by carbonic-acid gas exhaled from the mouth of the operator was to be feared. He called attention to the fact that the first third of the air expelled in the act of expiration does not

contain carbonic-acid gas, and that the chest of a child is not able to contain even a third of the air exhaled by an adult. He concludes, contrary to the opinion of Laborde, that it is better to practice insufflation with the mouth than with an insufflator, and that the process is neither irrational nor antiphysiological. He considers that further cases are required before it will be possible to decide the question, and that there are, in reality, many varieties of apparent death in the newborn.

Lacerated Cervix.

Dudley, of New York, ⁵⁹_{Aug. 21, '96} makes a very strong plea for immediate suture, which operation is easy while the vagina is relaxed and while the cervix can be readily drawn down to the vulva. The hæmorrhage from the circular artery is at once arrested, septic absorption is prevented, involution is not interfered with, and the formation of cicatricial tissue in the angle of the tear is prevented, thus saving the woman the many reflex disturbances which we encounter so often. All that is required is the bullet-forceps or vulsellum and an Emmet needle threaded with medium-sized sterilized catgut. The bullet-forceps can be sterilized by heat, while the needle and catgut may be preserved in a little bottle of absolute alcohol, so as to be ready at a moment's notice. The patient should be placed in Sims's position and his speculum used.

William R. Pryor, ¹_{Jan. 19, '96} at a meeting of the Society of Alumni of Bellevue Hospital, read a paper upon this subject in which he argued that there was but one indication for immediate repair of the torn cervix,—hæmorrhage. In the discussion which followed, however, the remarks of the author were opposed almost *in toto* by the various speakers, and primary trachelorrhaphy was strongly advocated.

Rupture of the Perineum.

H. von Woerz ¹¹⁹⁰_{July, '96} studied this subject with all the obstetrical cases in Schauta's clinic for the years 1892-94 as basis. The origin and extent of the rupture depends upon the duration of labor, the condition of the perineum, and the relationship which exists between the fully-dilated vulva and the largest diameter of the head. The following conditions lead to the too sudden passage of the head over the perineum, and consequently endanger it: 1. A sudden surprise given to the woman as the head is being born. 2. Strong and sudden combined action of the uterus and abdominal muscles when the head is bulging the perineum. 3. Too rapid delivery by operative interference. 4. A

small head advancing rapidly and dilating the vulva quickly. 5. Deformed pelvis in which there may be a large outlet through which the fœtus passes quickly, or those in which, owing to straightness of the sacrum or narrowness of the pubic arch, the head tends to be directed more directly against the sacral segment of the pelvic floor. As regards the condition of the perineum, he agrees with Olshausen: that a too broad and thin perineum predisposes to rupture, that an inflamed or varicose perineum frequently ruptures, that in primiparæ it is generally torn, and that in multiparæ who have not borne children for a long period it is especially apt to occur. As to the relationship between the child and the vulva, Woerz concludes that: 1. In labors the frequency of rupture of the perineum varies directly with the size of the born child. 2. Ruptures are more common when the perineum is not guarded than when it is. 3. By carefully employed protection of the perineum the ratio between the weight of the child and frequency or extent of rupture may be considerably modified.

George F. Barnes, of London, ²_{Aug. 21, '76} calls attention to a cause of rupture which is not generally recognized, one which, acting for a prolonged period during gestation, leads to changes in the structure and physical properties of the female perineum, rendering its chances of rupture at the time of delivery more probable. This cause is chronic passive congestion, from pressure of the uterus above, of the veins of the anal and perineal region, leading to piles, with local swelling of the former, and to a condition of œdema of the latter, with impairment of nutrition from interference with the local circulation, which condition of the perineum may be very slight or the reverse, and likely to be aggravated if there be much inflammation and consequent phlegmon around the hæmorrhoid, tending to spread forward directly into the perineal body.

D. B. McCartie, of Newark, N. J., ¹_{May 25, '76} contributes a long article on a new method for the preservation of the perineum, and states that, when the forehead meets the perineal floor while the head is descending, extreme flexion occurs, thereby giving the occiput the less chance of slipping out and passing under the pubic arch. When, therefore, the occiput is born, the pressure of the perineum pushes the base of the occipital bone under the pubic arch, and thereby some extension is caused. According to the usual rules, the accoucheur's duty is now to assist extension. McCartie, however, strongly advocates the opposite of this. When the resistance of the bony parts is removed by descent, the accoucheur should substitute a force for the natural one, to counteract

the elasticity of the perineum and maintain flexion. This may be done as follows: With the patient in the ordinary lateral position, the accoucheur places the finger-tips of the right hand on the occiput, as soon as it appears, with the thumb on bony portion of the parietal bone; pulling toward him, he is easily able to secure the required degree of flexion. McCartie argues that by so doing the suboccipito-bregmatic diameter of three and three-fourths inches comes into the outlet, while, if extension be permitted, the occipito-frontal diameter of four and one-half inches is concerned, and in this latter attitude the head forms a round, hard mass unlike the conical plug of the well-flexed head. He says the strongest pains are controlled by grasping the head as dictated, so that it is delayed till the perineum has sufficiently relaxed.

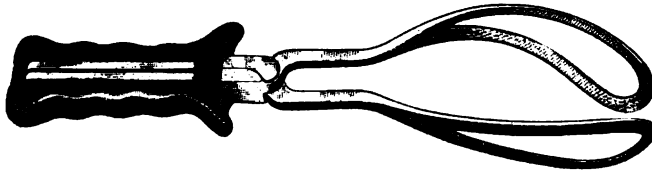


FIG. 1.

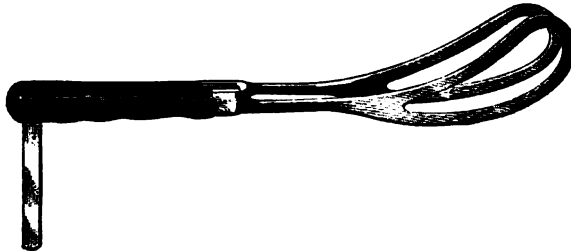


FIG. 2.

AXIS-TRACTION FORCEPS. (MCGILLICUDDY.)

Fig. 1, showing handles when not in use. Fig. 2, side-view, handles open.

New York Medical Journal.

Mordecai Price, of Philadelphia, ¹⁹July 12, '96 reports two cases of complete rupture of the perineum, and states that he has never yet had a failure in immediate closure of the perineum,—either partial or complete,—but has a number of times had complete failures of closure undertaken in from eight to twelve hours after labor. He does not regard it as good obstetrics or good surgery to leave a wound undressed for so many hours. The operation can be done with but little distress to the patient and without ether while the parts are benumbed by labor, while an operation a few hours after labor compels the use of an anæsthetic. In conclusion it may be said that, with the weight of the evidence of every obstetrician and surgeon of extended experience in support of the

truth of the statement, in all cases where injuries to the perineum are found to exist, immediate use should be made of every means and appliance to repair the injury.

Instruments.

T. J. McGillicuddy ¹_{Jan. 1, '96} presented at the New York Academy of Medicine a new axis-traction forceps, with which he claims that one can make ideal axis-traction during the entire passage of the foetal head with remarkable ease and safety. The author



FIG. 1.

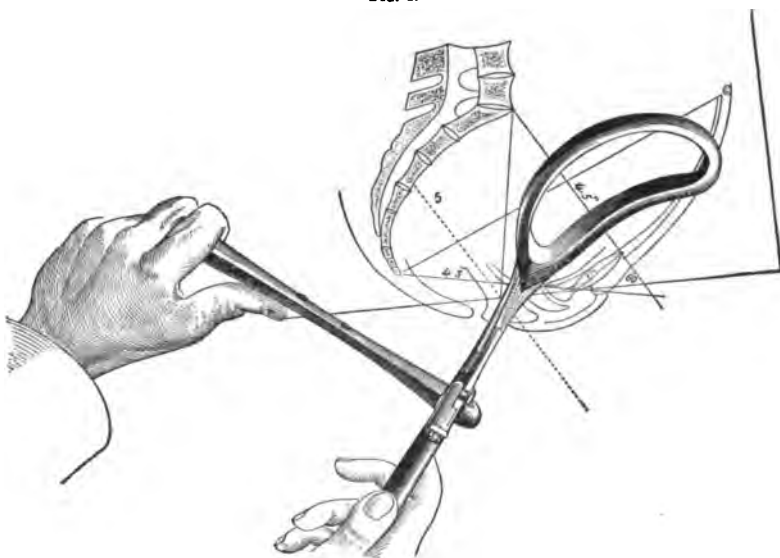


FIG. 2.

MODIFIED HUBERT FORCEPS. (FISHER.)

New York Medical Record.

states that, in cases where much strength must be employed, the obstetrician cannot perform axis-traction properly with the common forceps, by Pajot's, Smith's, or any other manœuvre.

With this forceps traction is made directly in the axis of the brim. The author states that one cannot grasp the handles of the ordinary forceps with comfort with both hands and still make any great axis-traction; the hands become cramped and lose all their muscular power after pulling for a short time.

R. W. Fisher, of Salt Lake City, Utah, ⁵⁰_{Mar. 16, '96} presents the above attachment (Fig. 1), which consists of a steel bar eight and one-

half inches long, with a slot in one end. He claims for this attachment that it can be applied to any forceps, that it is cheap, and that the force is applied nearer the resistance than in any other method. The thumb-screw is not essential and can be omitted.

Farabeuf ¹⁰⁰_{July 13, '96} states that he called the instrument shown in the cuts *préhenseur* because it takes the head and holds it solidly; *levier*, because (its greatest advantage) it imparts a rocking motion

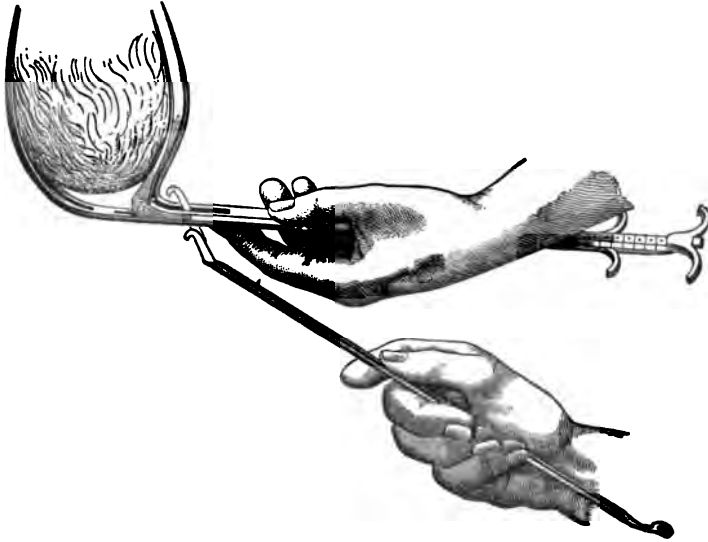


FIG. 1.

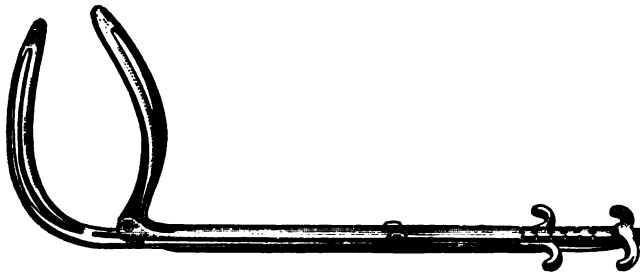


FIG. 2.

PRÉHENSEUR-LEVIER-MENSURATEUR. (FARABEUF.)

Gazette des Hôpitaux.

to the head, pushing it into the sacral concavity by lowering it in the hollow of the pelvis; *mesurateur*, because, as soon as applied, it enables the operator to ascertain the parietal diameter, which is absolutely necessary in order to compare it with the sagittal pelvic diameters before making a definite resolution.

Pinard ¹⁰⁸_{Nov. 16, '94} made the first application of Farabeuf's instrument at the Clinique Baudelocque. The case was one of twins.

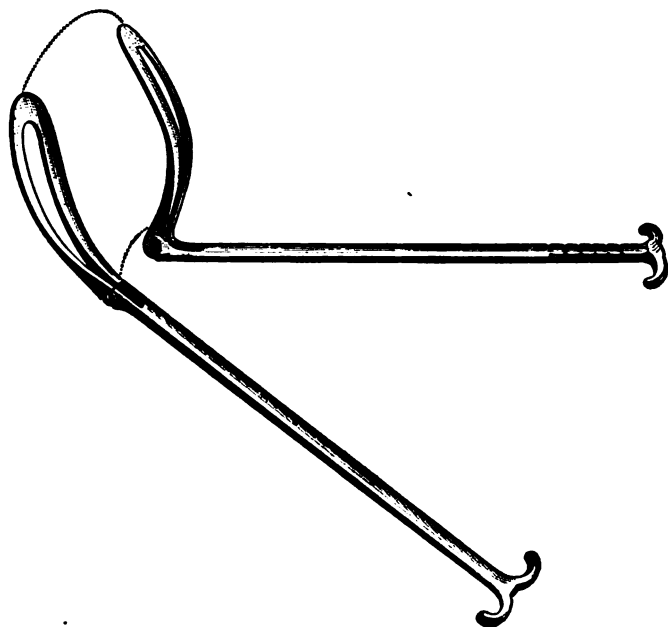


FIG. 3.

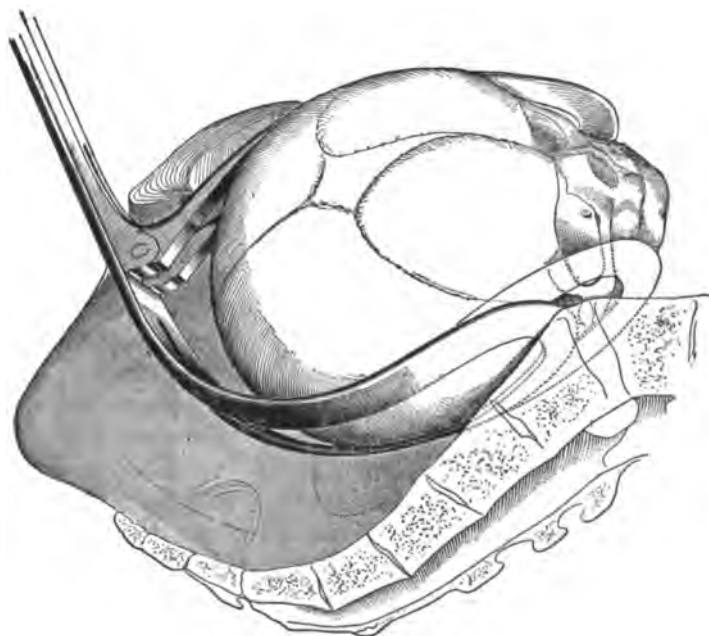
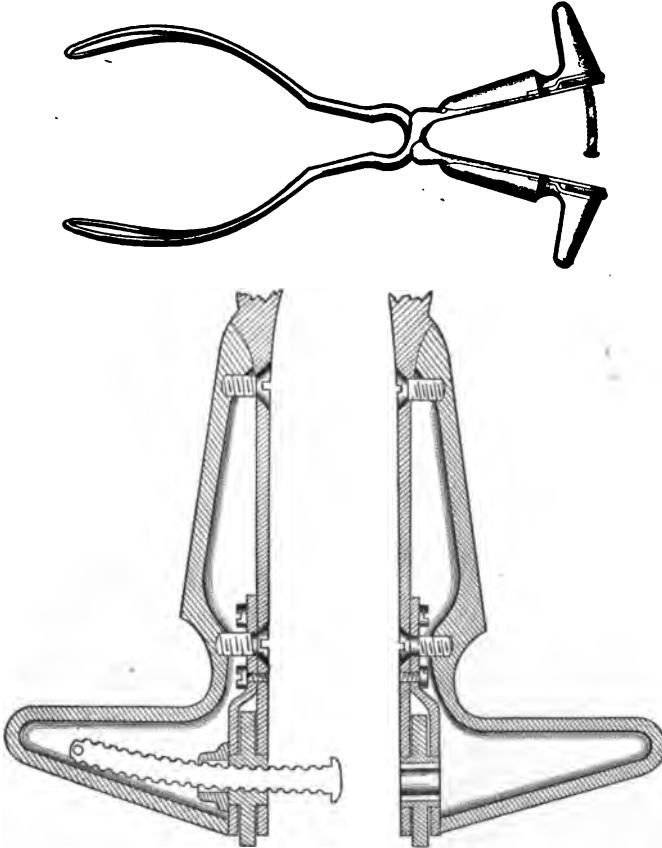


FIG. 4.

PRÉHENSEUR-LEVIER-MENSURATEUR. (FARABEUF.)
Gazette des Hôpitaux.

The first child was born normally; the second had a larger head, and was detained at the brim for six hours. Naegele's obliquity was present. The instrument, previously sterilized, was easily introduced, and seven minutes later the child cried.

A new lock for obstetric forceps has been devised by Edmond McW. Bourke.⁴⁹ It consists of a flat-racked bar which can be put on any existing forceps.



LOCK FOR OBSTETRIC FORCEPS. (BOURKE.)

British Gynaecological Journal.

DISEASES OF MAMMARY GLAND.

Lactation.

Wiedow³¹⁷ ¹¹² has reported the following statistics of lactation collected at the Freiburg Maternity. Out of 525 in child-bed only one-half could suckle thoroughly in the first two weeks.

Ninety-nine of these secreted no milk. Imperfect nipples were noted in 49 cases, fissured nipples in 46, and insufficient secretion of milk in 44. Only 33 suckled freely without any of the above-named unfavorable complications. Wiedow groups the breasts in three classes, according to the percentage of his series,—good breasts, 56 per cent.; medium, 21 per cent.; bad, 11 per cent. The development of the nipple bore a direct relation to the value of the breast as a secretory organ. Charrin¹²⁶_{Apr. 18, '96} verified the assertion, previously made by Genoud, Ettlinger, and others, that in the majority of cases the milk of perfectly healthy nurses contained staphylococcus albus, which explains the ease with which local abscesses may be produced by pressure.

Mastitis.

S. Rémy,¹⁸⁴_{Nov. 1, '94} referring to engorgement and abscess of the breast during the puerperal state, reports that several times in the service of the Maternity Hospital at Nancy he observed that during a certain period there were no cases of inflammation of the breasts, while at others, one case having occurred, a number of others would follow. The author attributes this to the fact that even in the most carefully kept ward there is, so to speak, a culture of septic germs which do not attain sufficient virulence to occasion serious puerperal accidents, but are capable of causing slight temporary febrile disturbances. The author distinguishes two varieties of mastitis, according as the inflammation affects the cutaneous covering of the gland or merely involves the tissue proper of the gland.

Treatment.—Kaarsberg,³⁷³_{May 18, '96} was induced to try a new treatment of mastitis by having observed that a woman who would not allow incision of her inflamed breast was cured by evacuation of pus from the nipple through sucking and pressure on the inflamed portion of the breast. He has since treated seventeen cases of mastitis by evacuation of the breast partly by sucking and partly by a sort of massage by which the breast is compressed and gently rubbed in the direction of the nipple. This treatment is repeated two or three times every day. Thirteen cases of mastitis which came under observation from the first day of the disease recovered in a few days, and suckling of the child could be continued; four cases in which the inflammation had already led to the formation of an abscess had to be treated by incision. The author remarks that veterinary surgeons always treat inflammation of the udder of the cow by milking it. (Report of Corresponding Editor Eklund, Stockholm.)

Comby¹¹⁸¹_{Mar. 15, '96} treated a case of mastitis, in a girl of 11 years,

a form which may be compared to that occurring in the newborn. Hard masses are felt in the gland, and a phlegmon frequently develops, as was the case in the present instance. Local applications of salol on absorbent cotton soon caused resolution.

Philander A. Harris ²³_{Aug., '96} states that inflammation of the nipple and breast should be regarded as a progressive rather than a self-limited disease, arising in most instances from septic infection of the nipple. It is attended by a train of pathological changes which become more severe and complicated until the conditions or circumstances which have produced them, and which favor their continuance, are abated or removed.

The inflamed breast, or the breast of an inflamed nipple, should be supported in a well-applied bandage, and no attempt made to nurse or withdraw the secretion until the entire subsidence of the inflammatory movement. He always bandages the breast after mastitis, still-birth, and whenever weaning is rendered necessary on account of mammary disorders.

Galactorrhœa.

Tailhefer ¹⁰⁸⁸_{Mar. 15, '96} reports a case of galactorrhœa treated by injections of oil. The patient, a primipara, was attacked by galactorrhœa and eczema of the breasts, after having had eleven abscesses of the right breast and four of the left. There was also dermatitis of the left thoraco-mammary region, which had developed at the beginning of a second pregnancy. Intra-canalicular injections of oil were resorted to, to induce glandular atrophy. Two were given with sterilized oil, a needle penetrating into each orifice of the galactophorous tracts. The injections were repeated every day, and recovery took place after one month and a half. This method was proposed by Claude Bernard.

Hypertrophy of the Mammæ.

Zweifel ⁸¹⁷_{No. 52, '94} exhibited, before the Leipzig Obstetrical Society, a woman, in the sixth month of pregnancy, in whom the mammæ had grown to an enormous size, the left being nearly twenty-two inches, the right over nineteen inches in circumference. The hypertrophy was limited to the glandular tissue; there was no increase in the fat; colostrum issued from the nipples; the hypertrophied glands were not tender. The author states that only one case of true hypertrophy of the mammæ, not including the fat, has been recorded.

An interesting case is related by John B. Hamilton, of Chicago. ⁶¹_{Mar. 9, '96} During the patient's first pregnancy the breasts had begun to enlarge and caused severe pain, but two weeks after the

labor they had resumed their normal size. The same condition, but somewhat less marked, presented itself during the second pregnancy. Just before her third pregnancy the breasts began to enlarge a third time. She grew weak and an abortion followed at five months; the breasts did not diminish in size, but increased until she came to the hospital. The right breast measured fourteen inches from the nipple to the pedicle, and the left thirteen and one-half. The patient was unable to walk without assistance, owing to the great weight—about fifty pounds—and bulk of the breasts. The latter were successfully removed and the patient promptly recovered. The main histological features consisted in an excess of connective-tissue elements showing highly refractile, non-nucleated fibre-bundles, taking deep stain with eosin; these fibres interlaced in all directions. Fat-cells were abundant, but vessels were lacking.

Alfred Sheen²_{July 4, '96} reported a case of unilateral hypertrophy in which the development had been very gradual,—nine years. No histological examination is reported. The hypertrophied breast was successfully removed.

Tuberculosis of the Mamme.

In a careful study of the pathological anatomy of a case witnessed by Sabrazès and Binaud⁴⁵⁷_{Nov., '94} the fact was noted that the patient was predisposed to tuberculosis by hereditary antecedents. They argue that in such cases the bacilli of tuberculosis remain inactive until awakened by some traumatism, and are then carried by leucocytes into the interstitial tissue of the breast in the region of the traumatized area, there causing the formation of a caseous abscess.

These conclusions are supported in a paper by Fiorentini and Parieti.¹⁵³_{Jan., '96}

Reerink⁷⁶¹_{B. 12, II. 1, '96} believes that there may be direct infection from without, though this is highly improbable in most cases. There may be extension from surrounding structures, which is probably the more common method, though not in the primary disease. Where infection from surrounding tissues is excluded, it is probable that the infection can only arise by the hæmatological mode.

Gaudier and Peraire,⁹¹_{Sept., '96} after a study of three personal and a number of reported cases, state that the tumor may be small and movable, and is, as a rule, painless. The nipple is generally retracted, and enlargement of the axillary glands often precedes the appearance of the tumor, even by some years. In later cases, with suppuration and much granulation-tissue, the rapid growth

may suggest carcinoma. The authors controvert the usually accepted view, and insist on the epithelial, intra-acinous origin of the growth. They, however, never found any bacilli in the ducts of the gland.

In one of two cases witnessed by Catellani, ⁹²¹ Jan. 1, '96 in which the diseased areas were removed, there were three tumors in the breast varying from the size of a pigeon's egg to that of a walnut. The general nutrition was good and there was no tuberculous history. The patient suffered from amenorrhœa and leucorrhœa and was a virgin. The tumors and glands were excised separately and found to be typically tuberculous. Koch's bacillus was seen in the sections made from the axillary glands. Inoculation experiments were negative. No local relapse nor any sign of tubercle elsewhere was seen in either of the two patients a year after operation

Mammary Actinomycosis.

Müller ⁸⁴ Dec. 18, '94; ² Jan. 19, '96 first refers to recorded cases in which the disease had begun in the chest and had implicated the mammary gland secondarily by extension. The occurrence of primary actinomycosis in the udders of swine and cows is readily understood by the contact of these organs with straw, etc. The author then records the two following cases of mammary actinomycosis, to all appearances primary in character: 1. A nodule appeared in the unused breast of a woman, aged 35, toward the end of lactation and after a blow. This was subsequently incised and pus let out. The wound healed in two months. Later the breast became hard, and eventually a sinus formed. On admission the patient looked well. There was a tumor in the breast about the size of a hen's egg, but no enlargement of glands. The sinus led into a cavity containing the characteristic granules. The whole breast was removed. The underlying pectoral muscle was healthy. The fungus was also found in sections from the breast-tissue. 2. A woman, aged 25, had pain, and, some months later, a tumor in the breast after a blow. This was incised. The wound soon healed, but six weeks later another tumor appeared. On admission the outer half of the left breast was very hard, with a sinus in it. The diagnosis lay between chronic mastitis with abscess and tuberculosis. The diseased tissue was excised, and sections prepared some months later revealed the ray-fungus. Both patients were cured. The author found about the carious teeth of the first patient a fungus resembling in many respects the actinomycetes. In the second case the origin was, if anything, even more obscure. In both cases there was a blow on the breast, an incision, and the application of linseed-meal poultices. The second patient had a

cough, but had no signs of pulmonary disease. The author then refers to a case of mammary actinomycosis recently recorded by Ammentorp, in which the patient worked in the harvest-fields with almost uncovered breasts.

Cysts of the Mammæ.

Boiffin, of Nantes, ¹⁰⁴³_{Oct. 1, '96} states that simple cysts, called true serous cysts, are merely an error of pathological anatomy. These cysts have no independent existence, and, with the exception of the galactocoele, they are all derived from either chronic mastitis, adenofibromatous or adenosarcomatous neoplasms, or epithelioma. In other words, they are only a more or less pronounced modification in the evolution of an inflammatory or neoplastic affection of the breast. Exploratory puncture is not considered by him of real diagnostic value, removal of the neoplasms affording the patient the best chances under any circumstances.

Bagourd ²⁰⁰⁰_{Mar. 2, '96} has studied true cysts of the breast, and states that different cystic formations may exist in this organ: cystic epithelioma of the breast, and the cystic affection described by Cooper and Réclus. Besides these varieties, Tillaux describes the true cystic formation, without any previous lesion of the gland, which, though pushed back by the sac, is in nowise invaded by its prolongations. This little tumor is very simple in character, and the prognosis is not serious. The treatment consists of partial amputation, but is instituted in such a way that the sac is not only emptied, but entirely enucleated, a recurrence being probable when the *débris* of the sac is left in the bottom of the wound.

Gaudier and Surmont ⁹²⁷_{Feb. 2, '96} describe a case of nodular disease of the right breast (Phocas) showing in the galactophorous canals staphylococci albus of attenuated virulence. A female dog was inoculated with this purulent liquid, and a chronic inflammation resembling that of the patient was the result. An anatomical examination showed that the subacute inflammation of the mammary gland, which was at first parenchymatous and afterward interstitial, caused it to assume a sclerocystic condition. The facts explain the relation between cystic affections and inflammations of the breast.

Heurteaux ¹²⁷_{May 12, '96} cites three cases of benign cyst of the breast in which an injection of iodoform and ether was given and recovery resulted: 1. A woman, 45 years old, nullipara. Serous cyst above the nipple about the size of a large nut; puncture and injection of a 10-per-cent. solution of iodoform in ether. Recovery permanent three years later. 2. A woman, 43 years old. Symptoms of cystic affection of the left and right breasts; on the

left one of the cysts was of the size of a nut; a puncture was made and iodoform and ether were injected. Several weeks later excision of the breast; the cavity of the punctured cyst was obliterated. Sixteen months later, a similar cyst of the other breast; a similar injection was made, and recovery was permanent three years later. 3. A woman, 47 years old, had a small cyst on the right; in the left breast two larger cysts were treated in the same manner in 1891. There was no recurrence.

Malignant Growths of the Mammas.

Diagnosis.—An oozing of blood from the nipple of a breast in which no appreciable change can be seen is a serious symptom. Delbet¹⁴ considers it a precursor of the development of a dendritic epithelioma. He adds that the discharge may precede the appearance of the tumor by several years.

Thomas Bryant,² speaking of a series of cases of cystic disease of the breast he had met with, most of which had been diagnosed as cancerous, pointed out that such errors of diagnosis might be diminished by due care. Difficulties of diagnosis and consequent uncertainty of treatment chiefly occur, of course, when any or many deviations from the typical examples presented themselves; these may be divided into three groups, the divisions being based on chemical symptoms alone: Group 1. Cases in which, either in a young, middle-aged, or even an old married or unmarried woman, there is some enlargement or thickening of a mammary gland without external evidence of anything being wrong, either in the integument covering the affected lobe of the breast, the nipple, or the lymphatic glands. Group 2. Cases in which there is a distinct and very evident lump the size of a hazelnut or walnut, encapsuled or unencapsuled, and inseparable from the breast-gland, with some of the local conditions generally accepted as indicative of a cancerous tumor, such as a flattened or reticulated nipple with or without enlarged lymphatic glands in the axilla. Group 3. In this group fall the cases in which, in the middle-aged woman just past child-bearing, the breast-gland is felt to be generally, or in one or more of its lobes, harder than natural, the knots varying in size from small to large peas, and in which there might be at times, with or without the application of pressure upon the gland, some discharge from the nipple of either a clear yellow or blood-stained fluid or some cheesy, pultaceous material, associated or not with an enlargement of some lymphatic glands.

As regards the first group, the main question is to decide whether the local lump or induration is an early cancerous tumor or

a cyst, or, if in any way connected with lactation, a chronic abscess. If the probabilities point to its being cancerous, the best course is an early exploratory incision as a preliminary measure to excision of the growth and gland should the diagnosis of carcinoma be verified. In Group 2, in which there is a distinct tumor and the diagnosis lies between a local cancer and a cyst, he urges the desirability of the possibility of its being a cyst being always present in the surgeon's mind. It is, he believes, owing to a neglect of this that so many mistakes of diagnosis are met with. Cysts do sometimes disappear by time and treatment, but such cases are not common, and their occurrence does not justify the practice of allowing the local trouble to continue without treatment. Cases of reputed disappearance of adenosarcoma and of cancer are probably instances of mistaken diagnosis, and really cysts. Bryant has never known a tumor which was solid disappear without surgical assistance. Instances were numerous in which cysts, said to have disappeared spontaneously, had subsequently re-appeared. In some cases the re-enlargement of the cyst might be genuine, while in others the cysts might be of the proliferating kind. In respect of Group 3, the cases falling into this group were too often regarded as cancerous without going carefully into the points which ought to guide them in deciding that question. In conclusion, he states his belief that in the three groups of cases a place would be found for most, if not all, the doubtful and difficult cases which came before them. He particularly insists on the fact that, if surgeons always took with them to the bedside the thoughts and methods of investigation to which he had called attention, many of the difficulties would be lessened, if not altogether avoided, and a conclusion would be arrived at on which a sound treatment could be based, to the advantage of the patient and to the credit of the surgeon.

Treatment.—W. Arbuthnot Lane ⁶_{Oct. 12, '96} states that since he adopted the operative measures formerly proposed by him—namely, removing the pectorals, carefully dissecting away every particle of glandular and areolar tissue from the axilla, and also, if necessary, dividing the clavicle and clearing out the subclavian triangle—he has found himself very well repaid for the extra time and trouble such an operation demands. The very slight added risk from hæmorrhage and a certain limitation of movement resulting from the removal of the pectorals more than compensated for the subsequent increased duration of the patient's life.

Willy Meyer, of New York, ⁵⁹_{Dec. 18, '94} recommends the following radical procedure: A skin incision embracing a liberal area around the nipple and running across the axilla to the point of insertion

of the tendon of the pectoralis major muscle is made. A second incision is carried at right angles to the one just described, running to the junction of the middle and outer thirds of the clavicle. After the skin-flaps are reflected the tendons of insertion of the pectoralis major and minor muscles are divided, and these muscles, the axillary, subclavicular, and infra-clavicular fat and lymphatics, and the diseased breast are removed in one mass. The muscles are separated from their points of origin, and the new growth is not cut into during the operation. The vessels entering the pectoralis major muscle are clamped before they are cut. The wound is sutured as far as possible and axillary drainage is used.

Halsted, of Baltimore, ⁹⁶_{Nov. 2, '94} recommends a less radical operation, but the results obtained far outstrip those previously reported. He begins by a reversed figure-of-six incision through the skin and fat, the loop surrounding the breast, the arm extending well through the axilla. The costal attachments of the pectoralis major are then dissected off and the muscle split through opposite the scalenus tubercle of the clavicle; an incision is then made through the skin and clavicular attachment of the pectoralis major, and the split carried outward to a point near the insertion upon the humerus, at which point the muscle is cut off. The axillary fat and glands are dissected out with the mass, the pectoralis minor is cut through about its middle, the upper half reflected, and the lower half, together with the fat and cellular tissue beneath it, removed with the rest of the axillary contents; the dissection is then carried downward till the mammary gland and all the tissues before dissected out are removed from the outer border of the chest in one piece. The lower circular portion of the wound is drawn together by a purse-string suture and the triangular flap is left to cover the axillary space. No sutures are put into it, the dressings being depended upon to hold it in position, and the axilla is never drained. Very little disability of the arm follows this extensive operation, and what degree of it there is seems to be due to contracture of the cicatrix. In the 50 cases operated on by Halsted since 1889 there have been only 3 local recurrences. Of regionary recurrences—i.e., skin metastases at a greater or less distance from the scar—there have been 8, 3 of which have had the recurrences removed and appear to be perfectly well and 1 has inoperable cancer of the femur.

Eugene Rochard ¹⁷_{July 9, '94} objects to surgical intervention in carcinomatous mastitis in the pregnant or nursing woman. The same is not the case when acute cancer is developed in a woman in whom the mammary glands are not in a state of activity; the evolution of the neoplasm is in this case much less rapid and the

lesions less advanced when a surgeon is consulted. Moreover, only one breast is usually affected, which renders intervention less dangerous, and in such cases there should be no hesitation, and the operation should always be made not alone for the reason that there is nothing to lose by it, but also because the condition of the patient is thereby greatly ameliorated.

In an interesting article on the technique of operations for cancer of the breast, Charles A. Powers, of Denver, ⁶¹_{Mar. 2, '96} emphasizes the fact that the responsibility of the surgeon in these cases does not end with the simple removal of the growth. The patients are to be placed under the best hygienic conditions and are to be followed carefully from year to year. His rule has been to instruct them to return for thorough examination every three months, and in the interim if they find evidence of suspicious nodules. The more intelligent class of people will, as a rule, see the necessity for this and gladly comply. The poorer classes will often fail to return and must be looked up in their homes. As an evidence of the thoroughness with which this can be done, he refers to Bull's list of 118 cases in which 115 were kept under constant observation to the end. Internal recurrence admits of no relief. Local nodules may, however, be removed from time to time, and, while, in general, the prognosis in recurrent cases is unfavorable, yet we may often add to the comfort of the patient and at times achieve a lasting cure.

To assist the resolution of the local tissues after operation and prevent recurrence, J. Sherman Wight, of Brooklyn, ⁹⁶_{Oct., '96} recommends the persistent use of the bromide of arsenic. In some cases this remedy was given for two or three years, with occasional intermissions, the dose being from $\frac{1}{40}$ grain (0.0015 gramme) up to $\frac{1}{10}$ grain (0.0065 gramme), beginning with the smaller dose, which is gradually increased in size. In some cases he has employed the solution of the bromide of gold and arsenic, in doses from 5 to 15 drops after meals. These remedies were given on the theory that they are antagonistic to the infection of the disease under consideration. The carbonate of lime was also given to some extent, as an adjuvant to the other remedies, but Wight found it of inferior value as compared with arsenic and gold.

For inoperable cases Bernardt ⁸⁰_{May 16, '96} highly recommends interstitial injections of salicylic acid. Not only were the local symptoms—hæmorrhages, sloughs, odors, pains, etc.—alleviated, but the general condition of the patient is said to have shown marked improvement after a few days. These results led Tofius, of Moscow, ²¹¹_{Feb. 10, '96} to try interstitial injections in seven cases, and he

obtained results which he considers far superior to those usually afforded by any other method of inoperative treatment. Injections of salicylic acid produce a rapid diminution in the amount of hæmorrhage, and sometimes its complete cessation, and also of the sloughing. They lessen the pain, produce a gain in the general condition of the patient, and finally retard the progress of the disease. The injections are renewed every four or five days, after careful antisepsis, 1 to 4 cubic centimetres (15 minims to 1 drachm) of a 6-per-cent. alcoholic solution of salicylic acid being repeated seven to thirteen times.

[See "Cancer," vol. iii, section L, pages 2 to 28.]

DIETETICS OF INFANCY; DISEASES OF THE NEWBORN.

By ANDREW F. CURRIER, M.D.,

ASSOCIATE EDITOR,
NEW YORK.

DIETETICS OF INFANCY.

General Considerations.

Biedert,⁴_{Oct. 20, '94} ²_{Dec. 15, '94} whose name always carries great weight, announces that there is no antagonism between the chemico-physical principles of infant feeding and the bacteriological considerations which have recently been treated of by Heubner. Undigested cow-casein will serve as a good soil for the growth of micro-organisms. Intestinal antisepsis chiefly depends on good digestion and absorption of the intestinal contents. The stools of those who are fed on cows' milk are notably different from the soft, yellow stools of the breast-fed. The cæcum and the large intestine form the chief site for pathological processes in deranged digestion; hence the value of intestinal irrigation. Breast-fed children may apparently thrive and yet have thin, diarrhoeal stools, containing mucus, but this will not be the case with those fed on cows' milk. Boiling and the subsequent cooling of the milk is approved of by him; also Soxhlet's apparatus. Micro-organisms may be found in the saliva, stomach, and intestine. Cream added to milk increases its nutritive value. Loefflund's half-peptonized milk resembles human milk, but cannot be effectually sterilized. Human casein and cow-casein are chemically different.

Crozer Griffith, of Philadelphia,¹¹²_{Apr., '95} ⁵¹_{June, '95} thinks cows' milk the most satisfactory substitute for the natural food of infants. With it a substance sufficiently resembling breast-milk can be prepared by suitable dilution of the albuminoids and addition of cream and milk-sugar. He recommends the following mixture:—

Milk,	1 ounce	(30 grammes).
Cream (skimmed, 16 per cent. fat),	2 ounces	(60 grammes).
Or, Cream (centrifugal, 20 per cent. fat),	1½ ounces	(46 grammes).
Soda bicarbonate solution,	1 ounce	(16 grammes).
Milk-sugar,	3½ drachms	(13 grammes).
Water, to make	8 ounces	(250 grammes).

Enough of this mixture to last twenty-four hours should be made in the morning, placed in bottles according to the age of the child, and the bottles placed in the sterilizer and heated to the

desired temperature. Modified sterilizing is preferable to Pasteurizing, and is effected by keeping it at a temperature of 80° to 90° C. (176° to 194° F.) forty-five minutes. If predigestion is to be combined with sterilizing, the following method is recommended:—

Water,	8 ounces (250 grammes).
One-half a peptonizing tube or one peptonizing tablet.	
Dissolve and add milk,	8 ounces (250 grammes).
Peptonize; then use	
Peptonized milk,	2 ounces (60 grammes).
Cream,	1½ to 2 ounces (46 to 60 grammes).
Milk-sugar,	3½ drachms (13 grammes).
Water, to make	8 ounces (250 grammes).
Sterilize as described above.	

Renk³⁴_{Feb. 19, '96} found that during the first week, after milk had been sterilized, only a small percentage of fat rose to the surface, but that in three or four weeks it increased to 30 to 40 per cent., and it would not again return to the emulsion form even after shaking and heating. This could then be removed as a completely sterilized cream. Thus we may obtain a butter free from germs.

Gärtner²_{Nov. 10, '96} recommends freshly separated diluted cows' cream as an infant food. The milk is diluted with an equal quantity of water and placed in a centrifugal separator. The fluid which runs from the cream-tap contains the cream of the original milk excepting 0.1 or 0.2 per cent., half the proteids, and half the milk-sugar. This resembles human milk except that it contains too little milk-sugar. This fat-milk also is free from the grosser impurities,—hair, etc.

Ward¹⁴⁷_{Aug. '96} agrees with the preceding authorities as to the precedence which should be given to human milk when obtainable, if the mother is in a suitable condition of health; also that the best artificial food is that which most nearly resembles human milk. Foods containing starch should be avoided for young infants. He analyzes and expresses his opinion of various well-known farinaceous foods, malted or Liebig foods, and milk foods. When constipation is present, it is often due to a deficiency of fat in the food. Starchy foods cannot be digested before the twelfth month, and can then be given cautiously. Important in connection with the foregoing is the matter of diet for nursing mothers. This subject is treated by Platt¹¹³³_{June, '96} in an article in which he recommends the following dietary:—

Eggs,	4 ounces (125 grammes).
Bread,	24 ounces (750 grammes).
Butter,	2 ounces (60 grammes).
Beef,	2 ounces (60 grammes).
Milk,	32 ounces (1000 grammes).

Mutton,	8 ounces (250 grammes).
Potatoes,	12 ounces (375 grammes).
Green vegetables,	4 ounces (125 grammes).
Fruit,	6 ounces (185 grammes).
Sugar,	1 ounce (30 grammes).
Total,	95 ounces (3000 grammes).

One-third of the foregoing is fluid.

Heubner, ²²_{Feb. 5, '96} while supporting the judgment pronounced against starchy foods, had ascertained, by careful experiment, that provision was made for the digestion of such food by children under 6 months of age. Ptyalin had been found in a child only 1 day old, and in children several weeks old digestive material was found which would convert a certain quantity of starchy food. If rice or other starchy foods were employed, from necessity or otherwise, not more than 7 per cent. should be used.

Boissard ¹⁵²_{Aug. 16, '96} describes the use of an artificial maternal milk, modified and sterilized, which he has used with satisfactory results in several of the Paris hospitals for children. It is said to resemble closely the natural product in appearance and in results.

Axel Johannessen ²_{Apr. 4, '96} describes analyses which he has made of the milk of twenty-five nursing women. Such analyses have been often made, but occasional repetition does not impair their value. Albumin averaged about 1 per cent., fat 3.21 per cent., sugar 4.67 per cent., and specific gravity 1025 to 1036. The albumin diminished as lactation progressed; the sugar increased; the fat decreased at first, but increased at the end of the year. The milk of a primipara was slightly richer than that of a multipara. The greatest quantity of fat was in women from 20 to 25 years of age; of albumin, in those between 25 and 30; and of sugar, in those above 30. The milk of blondes was richer in fat and sugar and poorer in albumin than that of brunettes. A starchy diet yielded a milk poorer in sugar and albumin and richer in fat than one fed on a mixed diet. A change to a diet rich in proteids and fats was followed by an increase in the percentage of albumin and fat. Bacteriologically the cultivations were negative in 43 cases; in 5 there was staphylococcus pyogenes albus and in 1 pyocyanus. In 1 case the milk from the right breast contained 2.29 per cent. of fat, while that from the left contained 6.29. In another case the milk from the right breast yielded 5.5 per cent. of fat, while that from the left showed only 2.4 per cent.

Wiedow ²_{Aug. 17, '96} analyzed 525 cases at the Freiburg Maternity with reference to lactation statistics. Only half of them were able to nurse their babies during the first two weeks. In 99 no milk at all was secreted. There were imperfect nipples in 49, fissures

in 46, and insufficient secretion in 44. Only 33 suckled freely without complications. The development of the nipple bore a direct relation to the nursing power of the breast.

Concerning the mineral matter in human milk, Rotch⁵¹_{June, '96} found the following constituents:—

Unconsumed carbon,	0.71 per cent.
Calcium phosphate,	28.43 " "
Calcium silicate,	1.35 " "
Calcium oxide,	2.54 " "
Magnesium oxide,	0.96 " "
Alumina,	0.40 " "

The analysis of the potassium and sodium salts was unsatisfactory. The differences between this analysis and all previous ones were as follow: 1. The phosphoric acid was less than half as much as previously reported. 2. The magnesium is also less than half as much. 3. Silica and alumina were found, not having been found heretofore.

Assuming that the mineral constituents of human milk fluctuate according to individuality and other causes inherent in the human race, it is fair to assume that this analysis represents a fair average condition.

Vaudin¹⁴_{May 1, '96} reached the following conclusions concerning the phosphate of lime in milk: 1. Milk contains citric acid as an alkaline citrate, which helps to hold in solution the phosphate of lime which it contains. 2. This solution is due to the important rôle which lactose plays in the presence of alkaline citrates. 3. All the influences which can modify or destroy the molecular equilibrium of the salts dissolved in milk tend to precipitate tricalcic phosphate with excess of lime in the form of the citrate. 4. These facts show us in what conditions the phosphate of lime exists physiologically in the secretion of the breast which furnishes young animals with the elements necessary to the formation of tissue.

Anselm⁸¹⁹_{Sept. 1, '96} made a series of three analyses for the purpose of ascertaining the proportion of iron in milk, with the following results: I. 1468.6 grammes of milk were divided into two parts. In the first, to 1000 parts of milk there was 0.00147 of oxide of iron or 0.00103 of pure iron. In the second there was 0.0125 of iron oxide or 0.00875 of pure iron. II. 918.2 grammes of goats' milk contained 0.00130 of oxide of iron or 0.000910 pure iron; that is, to 1000 parts 0.001416 oxide of iron or 0.0009912 of pure iron. III. 1283.9 grammes of cows' milk contained 0.0016 oxide of iron; or, in 1000 parts of 0.00125 of iron oxide or 0.000875 pure iron.

Kulz²_{Aug. 3, '96} analyzed human milk and took every precaution to

prevent the entrance of atmospheric air. Five samples from three women were examined to ascertain the volume of gases contained. The result was: oxygen, 1.5 per cent.; carbonic acid, 2.5 per cent.; nitrogen, 3.5 per cent.

Gravière ³¹_{Sept 7, '95} concludes his thesis on the relative merits of wet-nursing and feeding with artificial foods as follows: 1. With regard to the comparative value of human and animal milk. Neither prolonged boiling nor addition of other substances can make animal milk as digestible as that from the human breast. The nature of the proteid materials in human and animal milk does not seem to be identical. 2. Wet-nurses frequently deceive parents and physicians in regard to the quantity and quality of their milk, but this objection is not so great as that which arises from the difficulty in preventing fraud in the milk which is purchased at the shops. 3. Animal milk is much more liable to contamination by pathogenic microbes than is human milk, the contamination occurring through the medium of the various receptacles which receive it before it arrives at the mouth of the infant. Sterilization of animal milk is rarely effected with completeness and certainty.

There are many who would disagree entirely with the foregoing opinion in regard to the inability to obtain completely sterilized milk. Blasius and Beckurts ¹_{Aug 31, '95} describe the product of a large dairy in Brunswick which is constant and even in its quality and has given the most satisfactory results in practice. It will keep three weeks and is furnished at a very low price. Flaack's process of sterilization is used, under chemical and biological control. It is passed through a centrifugal machine, the microbes being reduced to one-third of the original number, the specific gravity slightly lowered, while the proportion of fats, solids, and water is increased. The milk is then constantly agitated to keep the fats evenly mixed, and the temperature is raised by steam to 2° or 3° C. (3.6° or 5.4° F.) above the boiling-point. It is then placed in sterilized bottles, each holding one-third of a litre (quart), and closed by a porcelain plug and rubber ring fastened down with wire. Sterilizing is then completed by subjecting the bottles to steam heat for ninety minutes. The entire process requires five hours, the albumin being converted into peptone and all bacteria eventually destroyed. A method of sterilization of milk has also been described in a circular which has been sent out from the Bureau of Animal Industry at Washington. ¹⁴⁴_{Mar., '95} By this method the milk is subjected to a temperature of 155° F. (68° C.) for half an hour. It should be used within twenty-four hours.

An interesting article by Flügge^{1,76} discusses the subject of milk sterilization with great thoroughness. Pasteurizing for thirty minutes at 158° F. (70° C.) destroys the bacilli of tuberculosis, diphtheria, typhoid, and cholera, but it does not kill the bacteria which cause milk to spoil. The spores of such bacilli require steaming for from two to six hours. Cholera infantum is principally due to such germs, and they abound in cows' milk and artificial foods. A temperature of 200° F. (93.3° C.) destroys all the lactic-acid bacteria. The varieties which survive a brief heating at this temperature are: (1) the obligatory anaërobes which decompose milk and have resistant spores; (2) the aërobes or facultative anaërobes belonging to the group of hay or potato bacilli. The latter are very productive of intestinal disease in infants. The peptone produced in milk which has been sterilized is the most common cause of intestinal derangement. Toxins are also produced by certain varieties of peptonizing bacteria. Sterilization of milk should be effected only by the action of heat. Commercial partially sterilized milk, according to Flügge, is a wholly uncertain and dangerous preparation. Partially sterilized milk must not be allowed to become warm or remain warm after the sterilizing heat has ceased. It should be labeled "Heated milk not germ free. Must be kept below 65° F. (18.3° C.) or consumed within twelve hours."

Baginsky¹⁶⁹ adds his testimony to the superiority of mothers' milk to any other form, and to its value in preventing summer diarrhœa in infants. The bacteria contained in milk are the source of the diseases of this character. There is no specific bacterium in the diarrhœal stools of infants, but saprogenic bacteria from the albuminous elements of the food produce poisons which are absorbed and act deleteriously. Baginsky believes that absolute sterilization of milk is possible, but that the casein of such milk resists reagents and, when artificially digested with gastric juice, has an effect different from that produced by unsterilized milk; also that milk-sugar experiences certain changes after sterilization the influence of which upon the nutrition of infants is not yet entirely understood.

In regard to the bacteriology of milk Sterlonz²⁶ reached the following conclusions: 1. None of the methods of sterilization now used succeed in destroying the vitality of the spores of milk microbes. 2. In milk which is supposed to be sterilized can always be found certain species of aërobic bacteria which possess peptonizing properties. He has isolated five varieties of the bacillus lactis peptonans, respectively, α , β , γ , δ , and ϵ . They resemble the bacilli isolated by Flügge and Bujwid. 3. It is

probable that certain digestive disturbances occurring in children fed on sterilized milk are due to the formation of peptones by these bacteria. 4. The expensive methods of sterilization have no advantage over boiling in an ordinary clean vessel. After boiling the milk should be kept at a temperature under 60.8° F. (16° C.). 5. Milk containing peptones may not differ in taste from normal milk. A bitter taste may be due to the presence of peptone. 6. Sterilized milk develops peptone more readily than unsterilized. 7. Peptonizing bacteria act on the proteids of milk without elaborating any particular ferment.

Bendix,¹¹²_{Dec., '94} writing upon the digestibility of sterilized and unsterilized milk, reaches the following conclusions: 1. In healthy children there is no difference in the digestibility of the two forms. 2. In sick children the sterilized is digested equally as well as the unsterilized, notwithstanding the fact that less fat and nitrogen are absorbed by such children. 3. The taste and smell of milk may be somewhat changed by sterilization, but that does not prevent children from taking it readily. 4. The health of children does not suffer by the use of sterilized milk; they eat well, increase in weight, their stools are normal, and they never suffer from vomiting. 5. The transmission of disease from animals is prevented by the sterilization of milk. 6. Sterilization is preferable to Pasteurization, and heating the milk to 212° F. (100° C.), while it does not hinder its digestion, absolutely kills all bacteria and spores.

Hempel,¹⁰⁹_{Sept., '96} recommends the following measures in the preparation of milk for infant feeding: 1. Milk should be diluted with water in the proportion of 4 to 6. 2. The fats in milk, which before its dilution amount to 9.5 per cent., are reduced after treatment by the centrifugal method to 3.8 per cent., and in milk containing 7.5 per cent. of fats to 3 per cent. 3. To every litre (quart) of this mixture 9½ grammes (2¼ drachms) of albumin and 42 grammes (1½ ounces) of milk-sugar should be added.

Stockbridge,⁷⁸⁶_{July, '96} gives his opinion as to the preparation of a substitute for mothers' milk in the following propositions: 1. The unsuitability of cows' milk for infant feeding consists in the excess of casein which it contains. 2. Normal mothers' milk must be the standard and the composition of diluted cows' milk must approach such a standard as nearly as possible. 3. The prepared food must be predigested to make it equally digestible with mothers' milk, without the necessity of cooking. 4. It must be in a condensed form and sufficiently stable to resist decomposition and fermentation. 5. It must be soluble in water and in the digestive secretions of the youngest infant. 6. It must be palatable.

He thinks Carnrick's soluble food answers these requirements better than any other artificial food which is on the market.

Rotch,⁵¹_{May, '96} discussing the chemical and pathological characteristics of milk, refers to the important fact that breast-milk is alkaline. Any substitute for it must therefore, first of all, be alkaline. Cows fed on blue grass and on sugar-beets yield alkaline milk. It was also ascertained that milk drawn by sterile hands and under antiseptic precautions contained large numbers of micrococci and fine bacilli. When drawn through a sterile cannula it was practically sterile, and the second half of a milking under ordinary conditions was freer from bacteria than the first half. The conclusion therefore was that the bacteria do not necessarily come from external sources and that they may be derived from some part of the milk-tract between the udder and the end of the teat.

Koplik,⁵¹_{Oct., '96} has made important studies concerning the milk-supply of New York City. He referred to the fact that milk should be fed to infants only during two-thirds of the "incubation stage"; that is, during the period in which the acidity remains stationary. After this period the acidity increases, and with it there is an enormous increase in the number of bacteria. The incubation stage depends upon the temperature at which the milk is stored and the cleanliness attending its collection and distribution. In February, with a temperature of 13° Celsius and with an initial acidity of 84, city milk remained sweet without ice twenty-four hours, and in March it had been kept forty-eight hours. In summer it could not be kept more than five hours. When it is obtained from small shops, where there is usually little care or cleanliness in handling it, it should be obtained early in the morning, especially in summer weather, sterilized at 90° to 92° Celsius, and it would then be suitable for infant feeding. He thought the use of the centrifugal apparatus unnecessary if such precautions were used, as it tended to complicate the problem of milk-supply.

Harris,⁸¹⁴_{Mar. 15, '96} in the course of an interesting article on the chemistry and coagulation of milk, gives the following classification of similarities between blood and milk: 1. Both have a plasma in which are solid particles. Blood has red discs, leucocytes, and blood-plates. Milk has fat-globules and colostrum-corpuscles (sometimes). 2. Both contain representatives of each of the foodstuffs,—proteid, fat, carbohydrate, salts, and water. Blood has fibrin, globulins, serum-albumin, fat-dextrose, sodium and calcium chloride, and water. Milk has caseinogen, lactalbumin, fat-lactose, calcium phosphate, calcium chloride, and water. 3. Both fluids

coagulate by an enzyme, the clot entangling the solid bodies being jelly-like, filling the dish, then contracting and expressing serum and whey, respectively. 4. Decalcification of each prevents clotting. 5. In both heat is given out during coagulation. In both a low temperature retards coagulation. 6. Analysis of ash of milk is very similar to that of blood-corpuscles. 7. Blood is alkaline. Milk (human and bovine), when quite fresh, is alkaline or neutral. 8. The color in both is due to solid particles, not to the fluid, and to the scattering of the light by the opaque red discs and fat-globules, respectively. 9. Acids and alkalies destroy the suspended particles in each fluid. 10. Whey, like serum, contains a sugar, salts, and a soluble proteid.

Harris also found the following dissimilarities between blood and milk: 1. Blood has all its factors for clotting within itself, but milk has not. 2. Milk is a perfect food, but blood is not. 3. Blood-clot has fibres in a felt-work; curd has no visible fibres, but is molecular. 4. Fibrin cannot be dissolved and reclotted at will, but casein can. 5. The particles suspended in milk are specifically lighter than the fluid. Milk has a lower specific gravity than the fat-free milk. The particles in blood are specifically heavier than the fluid plasma. Milk minus solid matter is specifically heavier than before. Blood minus solid matter is heavier than before. 6. The pigment of blood is a proteid. The pigment of milk is a lipochrome. 7. The boiling of milk still leaves it liquid, but blood will coagulate under 100° C. (212° F.).

Jones⁵¹_{Apr. '96} publishes statistics showing that 42 per cent. of infant deaths are due to digestive disorders in England. In Sweden and Norway it is only 10 per cent., almost every child being nursed by its mother in those countries. In Wurtemberg the mortality of breast-fed children is 13.5 per cent. and of artificially fed children it is 42.7 per cent. In Munich it is, respectively, 15 and 85 per cent. In lower Bavaria, where maternal nursing is exceptional, it is 50 per cent. Of 718 fatal cases of infantile diarrhœa in Liverpool only 30 were breast-fed, 391 were raised entirely on artificial food, and 297 were partly nursed and partly fed on artificial food. It is clear, from the foregoing, that maternal nursing should be encouraged.

[We have given a very extensive review of the literature of the year upon the subject of infant feeding and foods for infants. The subject is, indeed, all important and intensely practical. The tendency everywhere is in the direction of greater care in the collection of milk and in its preparation for use. Perhaps the subject is becoming too refined and complicated. In the cities especially too great safeguards cannot be established around this important

industry. But we must remember that the poor and ignorant, no less than the rich and educated, must have this article of food ; and if the subject of its preparation is made too elaborate and too costly, the desired end will certainly not be reached. Perhaps a system of board-of-health stations for the preparation and sale of milk would be the best, the municipal government placing its seal upon every bottle which is sold. Then there would be a definite fixing of responsibility, a saving of a vast amount of trouble, and the most efficacious possible safeguard against fraud and disease. The poor particularly should be able to use the milk purchased as soon as they get it without any additional manipulation.—A. F. C.]

Hagenbach-Burckhardt,¹¹⁶_{Apr., '96} in discussing the care and diet of rachitic children, thinks that not only good nutriment is essential, but an abundance of pure, uncontaminated air. Want of sunshine and fresh air is favorable to the development of rachitis. The physician should recognize the disease early and insist on plenty of fresh air in addition to such food as sterilized milk, egg-albumen, and codliver-oil.

Krautz, of Munich,²²_{Mar., '96} has devised a bed for infants in which the evacuation of urine and stools takes place without soiling the infant's skin. It is placed on a basket-like wicker tray which has a double bottom, while the cover has a round opening through which the mouth of an India-rubber bottle is placed. The mouth of the bottle is placed through an opening in the bed and bed-clothes. The bed is provided with broad elastic bands by which the legs are so loosely fixed that the openings of the urethra and anus correspond to the mouth of the bottle. The trunk of the child is fixed by a suitable bandage. With its use Heubner had seen seven cases of intertrigo healed in a few days.

Chaumier¹⁴_{Sept., '96} speaks of the dangers which attend the placing of children in *crèches*, or day nurseries,—dangers from infectious disease of various kinds and dangers from want of cleanliness in general.

[The dangers are, indeed, real in those institutions which are without suitable care and supervision, but it would seem that such dangers could usually be forestalled and avoided as effectively as they are in hospitals for babies and small children.—A. F. C.]

Malnutrition.

Sansom,⁵¹_{Nov., '96} refers to one of the earliest evidences of malnutrition as an eruption upon the perineum resembling erythema and eczema. It is due to a morbid condition of the secretions and may disappear when the diet is changed. The perineum should

be washed in warm oatmeal-water and then dusted with fullers' earth or lycopodium. If there is rapid wasting, the affected tissues may become œdematous and fissured. If there is much abrasion, nitrate of bismuth or oxide of zinc may be applied advantageously. With such children, especially if artificially fed, flatulence is a common symptom, and the pain which is incidental causes great irritability in the child. In severe cases the abdomen becomes tense and the abdominal veins distinct. Aromatics, such as nitrous ether, are indicated.

Quite a discussion on the subject of infantile scurvy has been kept up during the year. Ashby⁵¹_{June, '96} criticises the views of Cheadle and Barlow, and thinks that the hæmorrhagic condition is an exaggeration of the anæmia which is always present in acute rickets. In some cases of congenital syphilis there is a tendency to hæmorrhage, and in certain cases of tuberculosis there is anæmia and bleeding from the gums. Rickets with hæmorrhagic diathesis is preferred as a name to scurvy rickets.

Machell⁵⁰_{Aug., '96} saw a case of infantile scurvy in an infant 11 months old, the first symptom being inability to use the legs and feet properly. It had been fed six months on oatmeal-gruel. In the course of a week the gums of the upper incisors became swollen and purple and the skin of the thighs and legs tense. Upon a diet of grape-juice relief to these symptoms was obtained in a week. Another case, in an infant of 9 months, is reported by Carr.⁵⁰⁶_{June 25, '96} Improvement followed a diet of beef-juice, orange-juice, and fresh milk.

Subdural hæmorrhage may occur in scurvy, as shown in a specimen presented to the London Pathological Society by Ord.⁵¹_{Mar., '96} The entire vault of the cranium was the seat of a clot, though no evidence of bleeding was found at the base. The patient was rickety and had been fed on artificial foods from birth. There was no history of syphilis, tubercle, or hæmophilia, and death had resulted from acute broncho-pneumonia. The disease did not attack a twin brother who was brought up identically the same as the patient.

Northrup⁵¹_{June, '96} summarizes his views on infantile scorbutus as follows: The disease is caused by the use of proprietary foods and condensed milk and the want of fresh foods. It occurs in children of the well-to-do between the ages of 9 and 14 months. Rheumatism of the legs and spongy gums furnish sufficient data for a diagnosis. Hæmorrhage may take place beneath the periosteum of the ends of the femora, the epiphysis becoming separated; also hæmorrhage into the muscles, skin, and mucous membranes. There is great pain on motion, usually anæmia,

and often pseudoparalysis. This disease may be superadded to rickets, but has no constant relation to it. Cure takes place rapidly under proper treatment, otherwise the result may be fatal. Fresh milk and fresh fruit-juice should be given. Barlow,¹¹² after whom the disease has sometimes been called, also gives a description of the disease. It does not differ materially from that which has been given by Northrup. Baginsky⁶ Mar. 9, '96 saw a case of this disease in Berlin. He recognizes the points advanced by Northrup and Barlow.

Furst⁵¹ June, '96 observed that the disease usually appeared late in the winter or in the spring; also that the entire body becomes sensitive and painful. Swellings are noticeable on the ribs, scapula, skull, and ilium; œdema on the dorsum of the foot, over the malleoli, and on the eyelids. Fever is not apt to be prominent as a symptom; the pulse is small, soft, and frequent; the appetite poor, and the sleep disturbed.

Love⁹ May 26, '96 has seen five cases of the disease in feeble, badly-nourished children. The disease is sometimes mistaken for rheumatism. Cases are also reported by Wise,⁸¹⁴ July 15, '96 Egan,⁶¹ Feb. 9, '96 Blackader,⁵¹ May, '96 Dercum,¹⁹ Apr. 12, '96 and Snow.¹⁷⁰ Aug., '96

[I can add a case to the foregoing in a child 16 months old, of syphilitic family history. The symptoms presented were similar to those which have been mentioned. In spite of the treatment with fruit-juice and sterilized fresh milk the case resulted fatally. The disease presents points of similarity with that which was described some years ago by Parrot under the name of athrepsia.—A. F. C.]

Dentition.

Swaita⁵¹ Apr., '96 thinks that the reflex irritation of dentition may cause restlessness, disturbance of digestion, etc.; but it does not cause convulsions, brain disease, diarrhœa, or bronchitis. Such troubles can better be accounted for by errors of diet and atmospheric influences. Arnstein,⁶⁷³ July, '96 on the other hand, believes that reflex convulsions from dentition are possible, though of rare occurrence. He also observed from this cause general irritability, crying, etc.; also aphthæ.

J. Lewis Smith, of New York,¹⁵ May, '96 objects to the practice of lancing the gums of infants. When the gums are red and irritated, some other cause than dentition is usually attributable.

Kingston Barton² Sept. 21, '96 refers to the erosion of teeth in infants as due to absence of enamel with varying appearances, according to the resistance of the exposed dentine to the destructive processes of micro-organisms. It is primarily caused by error in

development during the suckling period. In two cases of early decay of the teeth there had been very injudicious artificial feeding.

DISEASES OF THE NEWBORN.

Tumors.

Comby¹_{Aug. 1, '95} has reported three cases of mammary abscess in the newborn resulting from pressure. Pestalozza saw a similar case resulting in suppuration, lymphangitis, and axillary adenophlegmon in a child 4 days old. The case ended fatally. Baginsky thinks that abscesses of this character are usually benign unless due to infection at birth.

Semb³⁴_{Nov. 13, '94} saw a sarcoma of the kidney in a still-born infant. The child was well developed, the tumor as large as a child's head. Such growths developed during foetal life are rare. Stein saw a congenital sarcoma of the intestine³⁸⁰_{Apr., '95} in a newborn infant. Death occurred on the fourth day. The tumor was in the large intestine and there were no metastases. In all other respects the child was normally developed.

A very curious case is reported by Ganz,⁵⁷_{Dec. 2, '94} consisting of pygopagous twins, of which the first was still-born and attached to a very feeble living child. The former had a fluctuating tumor thirty-four centimetres in diameter attached to the posterior surface of the pelvis. This proved to be a parasitic growth with a structure like that of the large intestine. Such a combination is quite unique.

Schwab¹⁶²_{Aug., '95} reports a tumor in the lumbar region in a newborn infant penetrating to the spinal canal. The tumor proved to be of the rare variety keratoma, producing a kind of secondary spina bifida. Lindsay²¹³_{Feb., '95} reported a congenital tumor in the lumbar region,—a spina bifida occulta. The child was still living at the fifth month. It was somewhat larger than it was at birth.

Defects, Deformities, and Birth Injuries.

Hildebrand³⁴_{Dec. 11, '94} made an elaborate report of 20 cysts and 10 fistulæ of the neck of congenital origin; also of 6 cystic tumors in the region of the sacrum. Neufeld³⁴_{May 21, '95} operated upon a congenital osteosarcoma of the skull, and gives, in addition, a review of the literature of congenital tumors of the skull. Hock²_{Sep. 21, '95} saw a case of congenital defect of the upper part of the sternum, a hernia of the left lung as large as a walnut resulting. Brun-deau²⁵_{Apr. 12, '95} reports two cases of abnormal Meckel's diverticulum in infants dying upon the fifth and tenth days, respectively. An

enlarged thymus gland in an otherwise well-developed infant caused death in the tenth week from convulsions. The case was reported by Bremner.⁵¹
Feb., '96

Laskine² observed a child with facial paralysis resulting from the use of the forceps after a severe labor lasting fifty-four hours. The child was a large one and had a syphilitic father. Openshaw⁵¹ treated a child with compressed skull, a well-marked constriction appearing above the zygomas, supra-orbital ridges, and across the centre of the occipital bone. There was ankylosis of the parietal bones and the occipital protruded over them. The frontal region was flat and receding. The labor had been long. The child cried almost constantly. It was thought that there was primary brain defect, the cranial deformity being secondary. Loviot⁴⁸ saw paralysis of the arm following fracture of the humerus, which occurred with the birth of the shoulders. The paralysis disappeared after a few days, a plaster jacket having been applied. Traumatic hæmatothorax resulted in a case of Gebhard's⁵ with breech presentation. It was supposed that the pleura was lacerated during labor, and the child was asphyxiated when delivered. Schultze's method of resuscitation was used, increasing or intensifying the injury already received and death resulted in three hours.

Pincus³⁴ speaks of the necessity of differentiating the hæmatoma of the sterno-mastoid muscle arising from rupture of the muscle in the ordinary course of labor and the traumatic myositis which is due to compression with the forceps, to twisting, to Schultze's method of resuscitation, etc. It is thought that the latter causes rarely give rise to the injury in question.

Blood.

Elder and Hutchison⁶ have made interesting investigations concerning the blood of newborn infants, the blood being drawn from the umbilicus immediately after birth. The red corpuscles numbered 5,346,000 per cubic centimetre, or 350,000 to 500,000 more than in adults. During the first day or two of life there was a rapid increase in the number, and this was followed by a gradual decrease. There was no difference, in their size or shape, from that which obtained in adults. The condition of the mother at such a time was one of anæmia, while that of the child was one of plethora. The hæmoglobin in infants' blood was 95 to 115 per cent. of the normal average. The white corpuscles in the child averaged 17,800 per cubic centimetre, or twice as many as in adults. It would therefore seem that there was no mingling of the maternal and foetal blood. These facts show the necessity

of promoting the health of the mother, as far as possible, during pregnancy.

Hæmatemesis in the newborn, according to Fulton,⁸¹⁴ is due to fragile blood-vessels and to defective coagulability of the blood. The causes are as follow: 1. Blood swallowed after injury to the oral or pharyngeal mucous membrane or drawn directly from the mother's breast. 2. Pulmonary hæmorrhage. 3. True gastrorrhagia from such conditions as atelectasis, syphilitic hepatitis, thrombi from the umbilical vein disturbing the portal circulation; from scorbutus and purpura; from gastric ulcer, and from epithelioma of the stomach, the latter being of rare occurrence. Careful attention should be given to the umbilical stump as a means of prophylaxis. Rest is the measure of greatest importance when hæmorrhage is actually present. Of other measures, aconite may be given by mouth, bromides by rectum, counter-irritation over the abdomen, and hamamelis or Monsell's solution in 1-drop or 2-drop doses.

Eyes.

Kalt,⁶ Oct. 27, '91, has had success in the treatment of ophthalmia neonatorum by irrigation with 1 to 5000 solution of potassium permanganate. The nozzle of a small funnel is placed between the eyelids and the fluid allowed to flow from a reservoir held about thirty centimetres above the eyes. Two litres (quarts) of the solution, at a temperature of 30° to 35° C. (86° to 95° F.), are used night and morning. If the cornea is ulcerated the irrigation must be practiced four times daily for three or four days, and afterward less frequently. Such treatment can be given by a nurse and is easier than cauterization.

Budin,¹⁵ Mar., '90, refers to the swelling of the eyelids which sometimes follows the use of Crédé's method of treating ophthalmia with nitrate of silver. He thinks a solution of 1 to 150 will be quite as efficacious as the 1 to 50 solution of Crédé. In over two thousand cases he had been satisfied with this plan of treatment. He also advocates, as a prophylactic measure, irrigation of the mother's vagina, at the beginning of labor, with 1 to 4000 solution of perchloride of mercury.

Genito-Urinary Organs.

Koblank,² Sept. 7, '90, treated an infant with gonorrhœal ophthalmia, which appeared on the fifth day. On the seventh there was bleeding from the vagina, and on the eleventh pus flowed from the vagina, in which gonococci were found. A similar case was seen by Morgenstein,⁵¹ Mar., '90, with severer local symptoms. The disease

was confined, however, to the genital organs. Cleanliness, bathing and syringing with a warm bichloride-of-mercury solution 1 to 10,000, and the application of beta-naphthol, bismuth, and boric acid produced good results. Haushalter,⁸_{Aug. 22, '96} saw a case of gonorrhœal rheumatism in an infant, 25 days old, who was also suffering with ophthalmia. The right knee and the left thumb were the parts affected. Fluid drawn from the knee-joint contained gonococci. Vahle,¹⁴_{Aug. 21, '96} found no bacteria during the first twelve hours of life in an examination of the vaginæ of twenty-five infants. After the third day micro-organisms were always present, and in 14.6 per cent. of cases there were streptococci. An infant under the care of Heaton,³²_{June, '96} died at the age of 6 weeks, having a pelvic and abdominal cystic tumor as large as a melon. The bladder and rectum were attached to it and the uterus was dilated. The vagina was imperforate and the tumor was caused by its enormous distension. Leyden,¹¹_{Feb., '96} saw a newborn infant with conjunctivitis and also a pustule on the gum, in the secretion of which he found gonococci.

Devé,²_{July 27, '96} records an interesting case in an eight months' foetus in whose bladder nearly seven pints of urine were found. The urethra was impervious and a mere fibrous cord for one inch of its length. The rectum ended in the bladder. This and other similar cases showed deficiency of urea in the urine. It is probable that the kidneys of the foetus eliminate only water and chloride of sodium, the true renal functions during intra-uterine life being discharged by the placenta.

[This case suggests a number of interesting questions concerning the work of the foetal kidneys. It is probable that their exact function is not yet clearly known. This is one of the fields which will bear careful investigation.—A. F. C.]

Flensburg,⁶⁹³_{Jan., '96} has found that immediately after birth the urine is charged with urates which arise from a secretion of the epithelial cells of the convoluted tubules during foetal life, which, with the hyaline elements, may be regarded as the primary origin of uratic deposits. The normal leucocytosis of the newborn is the cause of the increased quantity of uric acid in the urine.

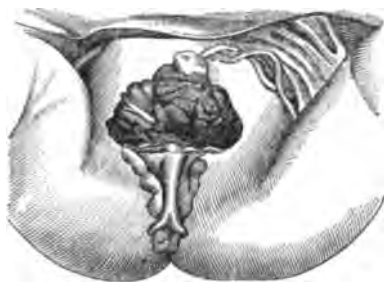
Cassaet,³_{Aug. 17, '96} made a series of interesting experiments concerning the toxic qualities of the urine of the newborn, varying quantities being injected into the bodies of rabbits. He concludes that such urine is only moderately toxic, destroying the life of animals only when 82 cubic centimetres (2½ fluidounces) per kilogramme (2½ pounds) of animal weight are injected. It seems to contain the same elements as the renal secretion in adults, causing the pupil to contract, producing drowsiness, diuresis, convulsions,

and lowering of temperature; but much larger quantities are required to produce these results than are required with the urine of adults. It shows also how perfect the assimilative function in the fœtus is.

Hervéou and Lautier,¹²⁸ July 15, '96, saw a newborn infant who was unable to urinate. The meatus was closed by a valve-like structure, which was pierced with a bistoury. Two other obstructions were met with which had to be perforated before the bladder was reached. The canal being opened, the child urinated freely and had no further trouble from this source.

Sawicki,¹⁶² June 25, '96, reports a case in which an infant was troubled with incontinence of urine and fæces from birth. The breech presented and a rupture of the perineum was apparent. When Sawicki saw the child, a month later, the wound of the perineum had cicatrized, but the rupture of the perineum into the rectum was complete. Lawson Tait's operation was performed upon the perineum and a cure was eventually obtained.

Feinberg,³¹⁷ Apr. 13, '96, saw an infant with inversion of the urinary bladder through an opening in the abdominal wall. The child was well developed and of more than the average weight; the rectum, however, communicated with the vagina. The case terminated fatally. The exact pathology in such cases is not clearly known. (See illustration.)



INVERSION OF THE URINARY BLADDER.
(FEINBERG.)

Centralblatt für Gynäkologie.

Nervous System.

Tetanus neonatorum has received attention from a number of writers, among them Turner,¹⁶ Aug. '96, who refers to the singularly prolonged epidemic of this disease which has prevailed in the Scotch Hebrides. In 1871 St. Kilda was nearly depopulated of children from this cause. A trained nurse, clean clothes for the infants, and antiseptic care of the umbilical stump have produced a revolution as to mortality statistics since the date in question.

Kleiner,⁵¹ May, '96, saw tetanus in twins born under perfectly favorable conditions. One of them developed the disease on the fifth day, nothing unusual being apparent about the umbilicus. The child was at once isolated, the umbilicus dressed antiseptically, and sedatives, hot baths, and enemata of pancreatinized milk administered. The symptoms increased in severity during the next

four days, at the end of which period the mother insisted that the child be brought back to her. Twenty-four hours later the other child manifested the disease. Both children were then treated with hypodermatic injections of sterilized salt solution, two ounces being thus injected every three hours; an injection of one-four-hundredth grain of the hydrobromate of hyoscine at three-hour intervals was also given. Both children recovered.

Dorland¹¹⁹_{Aug. 24, '96} refers approvingly to the investigations of Beumer and Peiper, which have done so much in clearing up the pathology of tetanus. Dorland refers also to the susceptibility of the negro race to this disease. Also to the fact that sepsis, and not climatic influence, is the most important etiological factor. He narrates a case occurring in a negro baby on the fifth day. The umbilicus was swollen, though the wound was clean and almost healed. The case resulted fatally two days later.

Runge⁵⁰_{Dec. 1, '94} reports a case which began on the tenth day of life. The treatment consisted in the use of large doses of bromide of potash, chloral, and antipyrin, and frequent warm baths. In five days all symptoms of the disease had disappeared. Franz¹²⁶_{July 15, '96} reports the results of the treatment of tetanus at the Infants' Hospital in Vienna during the past three years by sero-therapy. Out of a total of fifty-three cases so treated thirty resulted in cure. Those cases which were uncomplicated gave the most favorable results.

J. Lewis Smith⁵¹_{Dec. '94} contributes an interesting article on the etiology of tetanus. He refers to the investigations of Nicolaier, Rosenbach, and Brieger in this field; also those of Hewlett, and to the prevalence of the disease in damp and poorly-ventilated localities, amid general unhygienic surroundings. The soil seems to him the source of the infectious element. He suggests the importance of differentiating the disease from cerebro-spinal meningitis, for which it is sometimes mistaken.

Rotch⁵¹_{Aug. '96} records a fatal case of cerebro-spinal meningitis in an infant 6 days old. He warns the profession of the necessity of guarded prognosis in this disease and indeed in all cases of infantile convulsions.

Respiratory Apparatus.

Zuntz and Strassmann⁵_{July, '96} have made a series of experiments with the manometer relating to respiration in the newborn. Their results favor those methods of resuscitation which mechanically force air into the chest, and they are especially favorable to inflation of the lungs by means of a soft catheter introduced into the trachea.

Burckhardt⁵⁶_{July, '96} speaks of the necessity of discriminating between livid and pale asphyxia, the former giving a good prognosis, the latter, when uncomplicated, giving a better prognosis than is usually believed if therapeutic measures are adopted scientifically and persistently. The Schultze method of resuscitation is regarded as the best. Longenecker⁸¹⁴_{June 16, '96} has tried the method of resuscitation advocated by several writers, consisting of forcibly dilating, with the finger in the rectum, the sphincter ani, in combination with Sylvester's method, and with success; but he has not confidence in it if used alone.

Laborde's⁵⁹_{Mar. 16, '96} method of rhythmic tongue-traction in the treatment of asphyxia has had another year of trial, and, in the opinion of its author, continues to show itself a method of great value. He recently tried it upon an asphyxiated woman and found it equally as valuable as in newborn infants. Tarnier thinks the method more valuable than insufflation. Cameron²⁴²_{June, '96} reports a successful case treated by Laborde's method. Bernheim¹¹²_{Apr., '96} speaks a good word for the Laborde method and thinks its success is due to reflex irritation, which is referred to the respiratory centre through the motions of the base of the tongue.

Keilmann⁵_{July, '96} practiced Schultze's method in two cases in which the clavicle had been broken in extraction. Both cases recovered, and the broken bone united without deformity.

Tarachaud²_{May 4, '96} had great difficulty in resuscitating an asphyxiated child. He first immersed the child in hot and then in cold water without success; then insufflated for three-quarters of an hour with a soft catheter in the trachea. He then tried Sylvester's and Schultze's methods for an hour; then applied brandy over the tongue and chest; then tried insufflation again, and again immersion in hot and cold water. The last effort was successful, the case teaching the necessity of persistence in the treatment of suspended animation.

Rosenthal¹¹²_{Apr., '96} finds the following procedure an improvement over the Schultze method. The child is laid upon a table, its neck supported by a roll. The feet are so seized that the thumbs are in contact with the child's soles, the index finger with the back of the feet, the ring finger resting upon the tendo Achillis. The remaining fingers are closed. The knees, hips, and spine are then bent in regular motions, the knees touching the breast. Compression of the abdomen with expiration results; then, by stretching out the body inspiration follows. The larynx is not compressed, as may be the case by the Schultze method. The same author suggests, as an alternative measure, the suspension of the child by the legs, thus facilitating the ejection of inspired amniotic fluid and

blood. At the same time the finger may be passed down the throat to facilitate the removal of fluids, provoke vomiting, and thus compress the lungs. Such a method tends to prevent aspiration pneumonia.

Bissell⁵⁹_{Aug. 10, '76} reports seven cases in which suspended animation was treated by clearing the throat of mucus and holding the child in an inverted position until resuscitation occurred. In all cases vitality was restored and the children recovered.

[This procedure is so simple and easy of application that it is worthy of trial before any of the more complicated measures are resorted to.—A. F. C.]

Bedford Brown¹_{Dec. 4, '76} recommends the hypodermatic injection of whisky or brandy to restore suspended animation. He injects 5 to 15 drops in each arm, and in most cases has found the result prompt and satisfactory. The method is not adapted to those cases in which there has been profuse ante-partum hæmorrhage, or in which the circulation of the child has been impaired by the use of ergot to stimulate uterine contractions.

Dohrn⁵⁹_{July, '76} has made a series of examinations to determine the extent to which respiration is carried in the newborn. He found that during the first ten days of life the average number of respirations is 50 per minute. It is about the same with premature children as with those born at term, with boys and with girls. Respiration is less frequent during crying than in regular breathing. The average expiratory exhalation during the first ten days of life is 45 cubic centimetres. The volume of air changed in respiration is the same for children of both sexes, but is less for the premature than for the mature. The depth of respiratory movements increases from the first to the tenth day of life, the increase being 12 cubic centimetres by the end of that period. The cause of the increase is found in the enlarged play of the ribs, the dilatation of the bronchial tubes, and the increased respiratory necessity of the child. The first respiratory movements after birth do not unfold the lungs, the process being a very gradual one.

Epstein¹¹⁵⁸_{May 11, '76} calls attention to a form of pseudomembranous angina, caused by streptococci and occurring in the course of septicæmia, in newborn infants and young nursing children. It begins with redness and swelling of the bucco-pharyngeal mucous membrane, false membranes quickly appearing upon the velum palati, upon the tonsils, or upon the mucous fold, which extend from the upper to the lower maxilla. The false membrane extends rapidly, but does not involve the larynx and trachea. The temperature remains normal or may even be subnormal. The structure of the false membrane is the same as in true diphtheria.

The cases are always sporadic, resemble diphtheria, but lack the contagious character of the latter. Bacteriological examination showed streptococci in the blood, and streptococci, staphylococci, and a non-virulent bacillus in the false membranes. Streptococci alone were found in the fluids of the lungs. Epstein's conclusion is that the disease is the result of streptococci, and is a secondary manifestation of septicæmia which may proceed from a variety of sources.

Skin.

Hulot⁸¹_{Jan. 24, '95} attaches much importance to infections of the skin and by the skin in infants. Infection by the common microbes of suppuration are frequent. It may be benign, but it is not infrequently serious or even fatal in its results. In the fatal cases death is due to a slow toxæmia, with purulent absorption by the blood- or lymph- channels, or an intercurrent disease may be so modified by it as to cause the fatal issue. Bar and Rénon¹⁴_{May 22, '95} observed icterus with fever on the second day of life in a child of a syphilitic mother, born at term, and resulting fatally on the fifth day. At the autopsy the liver was found unusually large and contained enlarged vessels obstructed with blood-clots. One of the clots completely obstructed the lumen of the umbilical vein. Cultures made from the clots developed the proteus vulgaris of Hauser. Histological examination showed the hepatic lesions of syphilis; also characteristic lesions of infectious degeneration of the liver.

Baumel and Boiadjieff³_{Aug. 17, '95} saw a premature infant, whose mother had experienced severe hæmorrhage several days before its birth, that had bronzed skin, yellow and ecchymosed sclera, and passed urine which was, alternately, dark red, blue, and yellow. The urine contained indican, but no hæmoglobin, methæmoglobin, nor hæmatin. After a month the child recovered from all these symptoms. All these phenomena were attributable to faulty function of the liver, which was due to the ante-partum hæmorrhage of the mother.

Rille³_{May 22, '95} reports a unique case of psoriasis which developed a few days after birth and involved the entire surface of the body. Combined with it was a general eczema. Schmidt⁸¹_{June 4, '95} reports three cases of sclerema in premature infants, all resulting fatally. He believes the disease has an infectious origin. Garrod⁶_{May 4, '95} reports an additional case of the same disease ending in recovery, and discusses at length the history and treatment of the affection.

Karewski³_{Dec. 20, '94} saw an interesting and unique case of multiple subcutaneous sarcoma. The tumors were recognized at birth and

grew rapidly until, at the seventeenth week, their average size was that of a bean. One of them was excised, but quickly recurred. The structure was that of angiosarcoma. Two cases of contagious zona in children in the same family were seen by René Millon.¹¹⁵⁵ Grass and Torok⁸¹⁴ report a case of scaly exfoliation resembling ichthyosis sebacea in an infant, 1 day old, that died on the second day. The skin was uniformly dry, shiny, and clear, brownish yellow in color. The discoloration was especially apparent on the anterior surface of the trunk, the extremities, and the face. There were fissures in the skin and a tendency to exfoliation. There were no fissures on the back; the color was a lobster-red, and in other respects the skin resembled that on the anterior surface of the body. An autopsy revealed an hæmatoma into the substance of the right temporal muscle, hæmorrhage at the level of the parietal tubercles between the bone and periosteum, and also a hæmorrhage of limited area between the dura and the brain of the left side.

Alimentary Canal.

Schild¹¹⁵³ reports concerning the presence of bacteria in the intestines of newborn infants before the first nursing, and concludes as follows: 1. The contents of the rectum are sterile immediately after birth. 2. The first infection of the rectum takes place before alimentation has begun, and some of the bacteria of infection possess peptonizing qualities. 3. The necessary time for this infection averages from ten to seventeen hours. 4. The avenues of entrance for the infectious elements are the anus and the mouth; at first exclusively the anus, subsequently the anus and the mouth at the same time. 5. The sources of infection are the atmosphere of the room in which the infant is located and the water of the bath. Only in exceptional cases do the clothing and the vaginal secretions of the mother act in this way. 6. The sterilization of the infant's food is of no particular importance except to destroy pathogenic bacteria. 7. Pathogenic infection by way of the anus may take place in the same way as with adults.

According to Marfan,²¹¹ the best purgative for young infants is castor-oil in emulsion, combined with gum acaciæ, peppermint, and sugar. Scammony or manna may be substituted if the infant is unable to retain the oil.

Imperforation of the duodenum caused death in a case observed by Brindeau.¹⁴ Death occurred on the third day, the abdomen being filled by the distended duodenum. The rest of the abdominal organs were normal. In a case observed by Lafarelle,¹⁸⁸ the infant being 12 days old at death, there had been

fever, purpura, and general icterus. The liver was hypertrophied, the gall-bladder and the upper biliary channels normal, but the ductus choledochus was imperforate.

Melæna has been ably discussed by Jewett.¹⁵⁷_{Jan., '96} As causes Preuschen alleges hæmorrhagic diathesis, anatomical lesions of the vessels, fatty degeneration, too early ligation of the cord, swallowing caustic amniotic fluid, and gastritis. Landau thinks that arrest of the first inspiration causes embolism of a gastric or intestinal artery. Gaertner attributes the condition to a bacterial origin. Schiff thinks it may be due to intra-cranial lesion from the use of the forceps. Jewett inclines to the belief that in many cases the hypothesis of Schiff is the correct one.

Melæna is also reported by Thornton.⁹⁹_{Oct. 25, '94} in a case observed by him which, fortunately, resulted in recovery. A successful case of melæna is also reported by Wetmore.²⁸⁴_{Mar., '96}

The etiology of summer diarrhœa is discussed by Engelmann.⁹_{Mar. 25, '96} The local lesions and systemic effects were believed to be the results of micro-organisms and their toxic products acting locally or by absorption into the system. In the first case enterocolitis would result; in the second, pneumonia, meningitis, etc. The disease may be localized, the germs being confined to the intestine; or, if the latter enter the circulation, great systemic symptoms may intervene.

Grancher.⁸⁵_{May 18, '96} recommends, in the treatment of acute enteritis in infants, intestinal lavage with warm boiled water, a sufficient quantity of Vichy water being added. The injection is to be made with the infant lying on the side, first the right, then the left, the tube being carried into the bowel to the extent of fifteen centimetres and the water slowly introduced. If there is fetid diarrhœa 5 centigrammes of calomel may be given; also 1 drop of laudanum every hour. If there is obstinate vomiting lavage of the stomach should be practiced, and egg-albumen in water may be given by the mouth. Until the diarrhœa is arrested food should be withheld, but champagne and water may be given in moderate doses.

Para.⁸⁰_{Nov. 15, '94} has treated choleriform enteritis successfully with sterilized milk in addition to Soultzmatt or Vals water. Diarrhœa and vomiting were checked with the above-mentioned waters, after which the sterilized milk was given. He has abandoned the bismuth and lactic-acid treatment in enteritis in the newborn, such treatment being efficient only in children upward of 2 years of age. Blech.⁵_{July, '96} is also an advocate of intestinal irrigation and stomach-washing in the treatment of cholera infantum, hydrozone being used for the latter in the proportion of a tablespoonful to a

pint of water. For the intestinal irrigation he uses 2 ounces of hydrozone to a quart of cold water, repeating the irrigation every two hours if necessary. Morphia and strychnia may be given hypodermatically if necessary. No antipyretics are to be given, but if the fever is not reduced by the intestinal irrigation the entire surface of the body should be sponged off with alcohol.

Sokolow⁵_{Apr., '96} has made investigations to determine the resistance of the ileo-cæcal valve to the passage of fluid from the cæcum to the ileum. The distance to which the injection-tube is introduced into the bowel does not materially affect the passage of fluid to the whole extent of the large bowel, provided sufficient pressure is exercised; but it is desirable to carry the tube as high as the sigmoid flexure, to avoid overdistension of the rectum and consequent forcible expulsive efforts. He found the most desirable position for the injection to be the dorsal, with the thighs flexed and the pelvis elevated, and a pressure of not more than one to one and one-half metres. In 200 patients experimented upon the ileo-cæcal valve offered effectual resistance in only 27, while in 103 the fluid passed through the valve and into the small intestine. A pressure of more than three metres is liable to rupture the bowel or disorganize the valve. In very young children the resistance of the valve is less than in older ones. The method is useful in various morbid conditions, and also furnishes a means for intestinal feeding in such conditions as trismus, laryngeal disease, dysphagia from stenosis of the œsophagus; also in diseases of the stomach in which rest of the organ is indicated.

Dreus¹_{July 14, '96} recommends the use of tannigen in intestinal disease as a substitute for tannin. It is an ethereal derivative of tannin, a fine grayish-yellow powder without taste or smell, which is insoluble in the stomach and dissolves slowly in the intestine. The alkaline secretions of the intestine decompose it into potassium acetate and tannin. It has been used in small doses with good effect in chronic enteritis, dysentery, and tuberculous diarrhœa, and may be employed subsequent to the use of calomel and naphthalin. Its astringent qualities cause diminution of the secretion of the intestinal mucous membrane and regulate the hepatic and pancreatic secretions. It is also antiseptic to the putrid contents of the intestines and destroys bacilli.

Sansom¹⁴⁷_{Aug., '96} calls attention to the frequency of flatulent colic in infants, both in breast-nourished and artificially-fed children. Aromatics are indicated to stimulate the stomach and bowels to expel the flatus. Ten drops of nitrous ether may be given in a teaspoonful of water, or two grains each of powdered rhubarb and bicarbonate of soda with three minims each of aromatic spirit of

ammonia and nitrous ether, given in a teaspoonful of dill-water three times daily.

Umbilicus.

Budin ¹⁴_{Sept. 3, '95} calls attention to the fact that, in umbilical stumps with an abundance of Wharton's jelly, as the latter dries the ligature around the stump may become loose and hæmorrhage take place. He proposes to obviate this possibility by first ligating the stump, as usual, about one centimetre from its cut end, leaving the ends of ligature sufficiently long, and then drawing them over the top of the stump and tying a second time, this knot being at right angles to the first. In this way the vessels of the cord will be separated, two on one side and one on the other, the second ligature passing between them.

Broca ¹²⁶_{Apr. 15, '95} reports a case of umbilical tumor four centimetres long which proved to be an extruded Meckel's diverticulum. Mucus, but no fæces, exuded from time to time. The tumor was excised at its intestinal insertion, lateral enterorrhaphy was performed, and recovery followed.

Clayton ³²_{Apr. 7, '95} reports a case of congenital fæcal fistula at the umbilicus, due to persistence of the omphalo-mesenteric duct. All the fæcal movements passed through this opening. When first seen by the writer he was 16 days old, emaciated, and the mucous membrane of the bowel prolapsed to a considerable extent through the fistula. The rectum and anus were normal; digestion was imperfect. Death occurred on the twenty-second day. The autopsy showed imperfect development of the intestine below the diverticulum leading from the fistula, while the portion above it was normal.

Schliep ³¹⁷_{Sept. 7, '95} recommends applications of a 2-per-cent. solution of nitrate of silver to the umbilical stump twice daily, to hasten the dropping of the stump and the healing of the wound. With such treatment it will usually fall on the third or fourth day. Doktor ¹⁵_{Jan., '95} summarizes an article on the care of the navel with the following directions: (1) cut the cord as near the child's body as possible; (2) do not remove the bandage, after it has once been applied, except for good cause, and omit the child's bath, if possible, until the wound has healed.

Various writers during the year have insisted strongly upon the value of antiseptics in the treatment of the stump of the umbilical cord. Among them Hermes ⁵_{July, '95} describes the method of treatment at the Dantzig Obstetric Clinic. The cord is tied with fine-linen tape soaked in 3-per-cent. solution of carbolic acid and divided four fingers' breadth from the navel. The stump is dressed

with sterilized cotton smeared with carbolized vaselin, and over the cotton a linen bandage is secured. The dressing is changed daily after the bath. After the stump has separated the wound is dressed daily until it has healed.

Grosz ²_{Jan. 22, '96} observed more or fewer lesions of the umbilicus, notwithstanding aseptic treatment. He draws the following conclusions: 1. Fever may be present during normal healing of the umbilical wound. This is probably due to infection of the navel. On the other hand, the cord may slough without fever; that is, without general infection. 2. A fatal case in the author's experience showed the possibility of sepsis in the newborn as well as in puerperal women. 3. All possible precautions against infection should be observed.

Ehrendorfer ¹⁶⁴_{Nov. 8, '94} thinks that infection of the umbilicus rarely occurs by the medium of vaginal secretions or liquor amnii, but often by dirty hands. Antisepsis of the umbilical wound is as reasonable as antisepsis of any other wound. The use of sponges upon the wound is objected to. Starch-powder and salicylic acid in combination are recommended as a dressing, or a few drops of a 1- or 2-per-cent. solution of nitrate of silver may be used.

Bloch ³¹⁷_{Sept. 7, '96} reports a case of umbilical hernia in an infant that also had extensive deformity of the lower extremities. A case of hernia was also seen by Hecht. ¹⁸_{May 5, '96} It was cured by persistent pressure over the umbilical ring. Another case is reported by Wernitz, ³³⁶_{Aug. 24, '96} in which there was also persistent bleeding from the navel. In spite of pressure, styptics, and transfixion of the umbilicus with ligation, the bleeding persisted and resulted fatally on the twenty-fourth day.

[Cases in which ligation of the umbilical wound is ineffective should be very rare. Even in poorly-nourished, hæmorrhagic infants it rarely occurs that effective ligation of the wound is not possible. A wound of this character is so accessible that successful arrest of hæmorrhage is almost always possible if sufficient care be used.—A. F. C.]

Courdoux ³⁵_{June 23, '96} discusses the question of vegetating tumor of the umbilicus. This is a benign growth of fungous character appearing four or five days after the fall of the umbilical stump. It has been observed by Dugez, Simpson, Nélaton, and others, and is quite susceptible to treatment. It can be excised with scissors or ligated.

Holt ⁵¹_{June, '91} reports an interesting case of hæmorrhage in the newborn, from the umbilicus, the intestines, and under the skin. It continued for three days and gradually subsided. In spite of the severe symptoms the child recovered. Holt attributes such

hæmorrhages in children who are well developed to changes which take place in the blood during the first few days of life. He thinks the most important point in the matter of treatment concerns the nutrition. If the child can obtain a sufficient quantity of good breast-milk its chances of recovery will be good, the disease being self-limited in most of the cases.

Nammack⁵⁰_{Aug. 10, '96} narrates a fatal case of hæmorrhage in a newborn infant in spite of the most careful efforts to check it. He reviews the literature of the subject, excluding so-called hæmophilia (as did also Holt in the case above narrated). The organs of the child—heart, lungs, liver, kidneys, and intestine—were carefully examined; also the integument surrounding the umbilicus, with the umbilical vessels attached. The conclusion from the examination was that the hæmorrhage was due to degeneration of the walls of the vessels, streptococous infection being also present in the liver, spleen, and kidneys. The ultimate cause was believed to be syphilis.

In a paper upon the care of the newborn, Tuley⁵¹_{Aug., '96} devotes considerable attention to the treatment of the umbilicus. Aseptic treatment is the gist of the matter. An elastic band is thrown around the stump and the surface is freely dusted with equal parts of boric and salicylic acids.

Macé and Durante³⁵_{July 4, '96} report a case of endoperiphlebitis of syphilitic origin, the arteries of the umbilicus being hard, but otherwise healthy. The child survived. Syphilitic periarteritis which resulted fatally was seen by Bar and Tissier.³⁵_{July 4, '96} The child breathed but a few times after birth. There was a thrombus around the umbilical vein extending to the liver. Blood was also effused between the liver and the diaphragm. The vessels of the liver were enlarged; the heart was also greatly enlarged, and there was insufficiency of the tricuspid valve, patency of the duct of Botallo, and dilatation of the inferior vena cava, the pulmonary artery, and the aorta. The placenta was marginal, and this vicious insertion was believed to be responsible for the vascular disease which resulted.

Miscellaneous.

Chapin²_{Sept. 29, '94} has made a series of measurements of the skull and thorax of infants during the first two years of life. He thinks such measurements, taken at short intervals, of value as showing the rapid changes which take place in the head and chest during the early period of life.

Measurements have also been systematically taken by Frank⁵_{Mar., '96} with reference to the question of the maturity of children at birth.

First in importance are the length and weight; then the ratio between the circumference of the head and the girth about the

shoulders. If the shoulder-girth is greater than that of the head, the child is always at term. If the circumference of the head is less than 32 centimetres, the child is probably premature. If the temperature is subnormal the child is probably premature, unless the child has been partially asphyxiated for some time. Other data which are commonly considered of value in determining maturity are considered by Frank, in most cases of no value at all. A remarkable case of vitality in an illegitimate baby is reported by Booth.¹¹² It was dropped into a cess-pool vault and remained there ten hours before it was found. The mother was a negress, 16 years old. The child fell ten feet. The cord was not tied. It was covered with rags, paper, and straw. It was struck by three bricks, which were dislodged in attempts to extricate it. It had a subnormal temperature, but the following day it was in good condition. Two months later it was brought into court as evidence against its mother.



ACEPHALOUS OMPHALOSITE. (NAMMACK.)
New York Medical Journal.

As a demonstration of the influence of the mother's condition upon that of the newborn infant Finkelstein³ reports two cases,—the first, an infant, 9 days old, whose mother died of

puerperal septicaemia on the sixth day from parturition, the child suffering with septicaemia and dying on the tenth day, with evidences of extensive streptococcus infection; the second, an infant, 8 days old, born of a syphilitic mother with phlegmasia alba, showing to a marked degree the hæmorrhagic diathesis, and dying on the eleventh day. The second child showed infection with a diplobacillus, and its syphilitic inheritance rendered it an easy prey to this agent.

Jolis²¹²_{Aug. 10, '96} contributes a paper on the subject of galactophoritis in the newborn, the conditions which cause it, and the method of treating it. It is caused by infectious germs which penetrate the lacteal ducts, and is usually entirely local in its manifestations. The infectious secretion should be carefully expressed, the surface cleansed, boric acid applied, and a pressure bandage adjusted.

Jonkovsky¹⁴_{June 3, '96} reports a case of acute articular rheumatism, in an infant of 2 months, affecting the joints of the thumbs and attended with considerable fever. The mother was a sufferer from the same disease, which may or may not have been a coincidence. The condition yielded promptly under the influence of small doses of salicylate of soda.

Fœtal ascites is reported by Grimsdale⁵¹_{June, '96} in an infant whose mother was suffering with albuminuria and general anasarca. Delivery of the child could not be effected until the abdomen was punctured and a large quantity of fluid evacuated. The liver and kidneys were diseased. It was believed that the maternal nephritis was secondary to that in the fœtus.

Riga's disease, or necrosis by compression, which is quite prevalent in the southern provinces of Italy, is discussed by Brun.¹²⁸_{Apr. 16, '96} It consists essentially in a small tumor upon the frænum of the tongue due to hyperplasia and hypertrophy of the mucous membrane, and is supposed to be caused by the motion



DEFECTIVE DEVELOPMENT OF ABDOMINAL WALL. (HIRST.)
Medical News.

of suction. A case is reported in which the tumor was excised and cure rapidly resulted. "Inanition fever" is a term applied by Holt⁸⁸_{Dec., '94} to a condition frequently seen by him in which the infant loses considerable weight during the first few days of life, this loss being accompanied with considerable elevation of temperature. Recovery is the rule, and the treatment consists in the administration of plenty of water or milk and water until the lacteal function in the mother is well established.



UNITED TWINS. (MINICH.)
Indiana Medical Journal.

Teratology.

The very rare condition of acephalous omphalosite is reported by Nammack,¹_{July 20, '96} a picture of the specimen being reproduced. With the exception of the head, the fœtus appeared to have developed normally. The parasitic development, as seen in the picture, was from the head. (See page I-28.)

Defective development of the abdominal wall, as seen in the illustration on preceding page, is reported by Hirst.⁹_{Feb., '96} He states that such defect is usually accompanied, as in this case, by absence of the lower extremity on the side of the defect.

Milligan⁵⁹ and Minich⁵⁶ each reported a case of united twins similar to the foregoing illustration.

Cook¹¹² reports the very rare condition of ischiopagus, of which an illustration is also reproduced herewith.

Hall⁸⁶ delivered a child without a neck which was apparently anencephalous. The mother had been frightened by seeing a lizard during her pregnancy. Barry⁵⁹ has collected a series of thirteen reported cases of monstrosity of various types. He discusses their etiology and reaches the conclusion that maternal impressions during pregnancy have much to do with their existence.

Anencephaly is reported by several writers, including Verdelet,¹⁸⁸ Appert,²³⁶ Angell and Elsner.²⁰⁰⁸ Curatul observed² anencephaly in one twin and *fœtus papyraceus* in the other. Ballantyne³⁸ observed anencephaly together with retroflexion of the spine. The same rare combination was observed two years before by Ballantyne at a birth. The same author observed bilateral hydronephrosis in another case, and reaches the important conclusion that the liquor amnii during the later months of gestation is derived, in part at least, from the renal secretion of the fœtus.

Nosencephaly is reported by Rothschild⁹⁰⁶ and Souligoux and Paquy.²⁴ Ectromelia is reported by Schirman,⁵⁹ the defect consisting essentially in imperfect development of the cranial bones.



ISCHIOPAGUS. (COOK.)
University Medical Magazine.

Schiller²_{July 27, '96} describes an acardiac parasite of extremely rudimentary development. There was a separate cord for the autosite as well as the parasite, both attached to a single placenta, the umbilical vein of the parasite, however, opening into that of the autosite, and the single umbilical artery of the parasite anastomosing with one of the umbilical arteries of the autosite.

Sirois¹²²_{Sept., '94} saw a foetus of seven months without genital organs or anus, and Smith⁶⁴⁵_{Oct., '94} a full-term child with neither genital organs nor upper or lower extremities. The latter lived twenty days.

Tucker⁵⁹_{Nov. 10, '94} delivered a well-developed child with the parasitic addition of a left foot and leg connected by osseous and fleshy union with the upper dorsal spine.

Teinberg¹⁹_{Aug. 10, '96} delivered twins united at the coccyx by a band of tissue two and one-half inches long and five inches in circumference. There was but one anus, and the external genitals were farther back than normal. There was a normal placenta, the common cord bifurcating an inch from the placenta. It was believed that a successful operation for separation could be performed.

BACTERIOLOGY.

By CHARLES E. SAJOUS, M.D.,
PARIS.

Immunity.

Phagocytosis.—The controversy between Metchnikoff and Pfeiffer regarding the part played by phagocytes in the destruction of pathogenic germs was reviewed in a paper published by the latter, ⁵⁸_{V. 16, p. 287} in which he expressed the view that, so far as intra-peritoneal infection of guinea-pigs with cholera germs goes, the phagocytosis theory of Metchnikoff must definitely be considered as erroneous. The destruction of the Koch vibrio is due, in his opinion, to elements other than the phagocytes, and any part played by the latter can only be considered as a concomitant phenomenon of secondary importance. Pfeiffer was led to this conclusion by experiments on immunized guinea-pigs in the peritoneal cavities of which he had injected contaminated bouillon. The peritoneal liquid—withdrawn ten, twenty, and thirty minutes after injection—was found to contain quantities of small, round, motionless granules, representing as many degenerated and dead vibrios. This result could not, he thought, be attributed to phagocytes, the peritoneal liquid containing but a minimum quantity of leucocytes (certain forms of which in the vertebrata are phagocytic), and these having only shown themselves when the liquid portion of the exudate had already destroyed all the vibrios injected. The conclusion was obvious: the destructive process had been the result of extra-cellular action, the serum alone having exerted bactericidal power. Pfeiffer had already shown himself an adversary of the phagocytosis theory, the presence of destroyed organisms within phagocytes, though recognized by him in his researches in connection with the influenza bacillus and in cholera-immunized guinea-pigs, being attributed to their power of destroying dead germs after the bactericidal action of exudation serum had killed them.

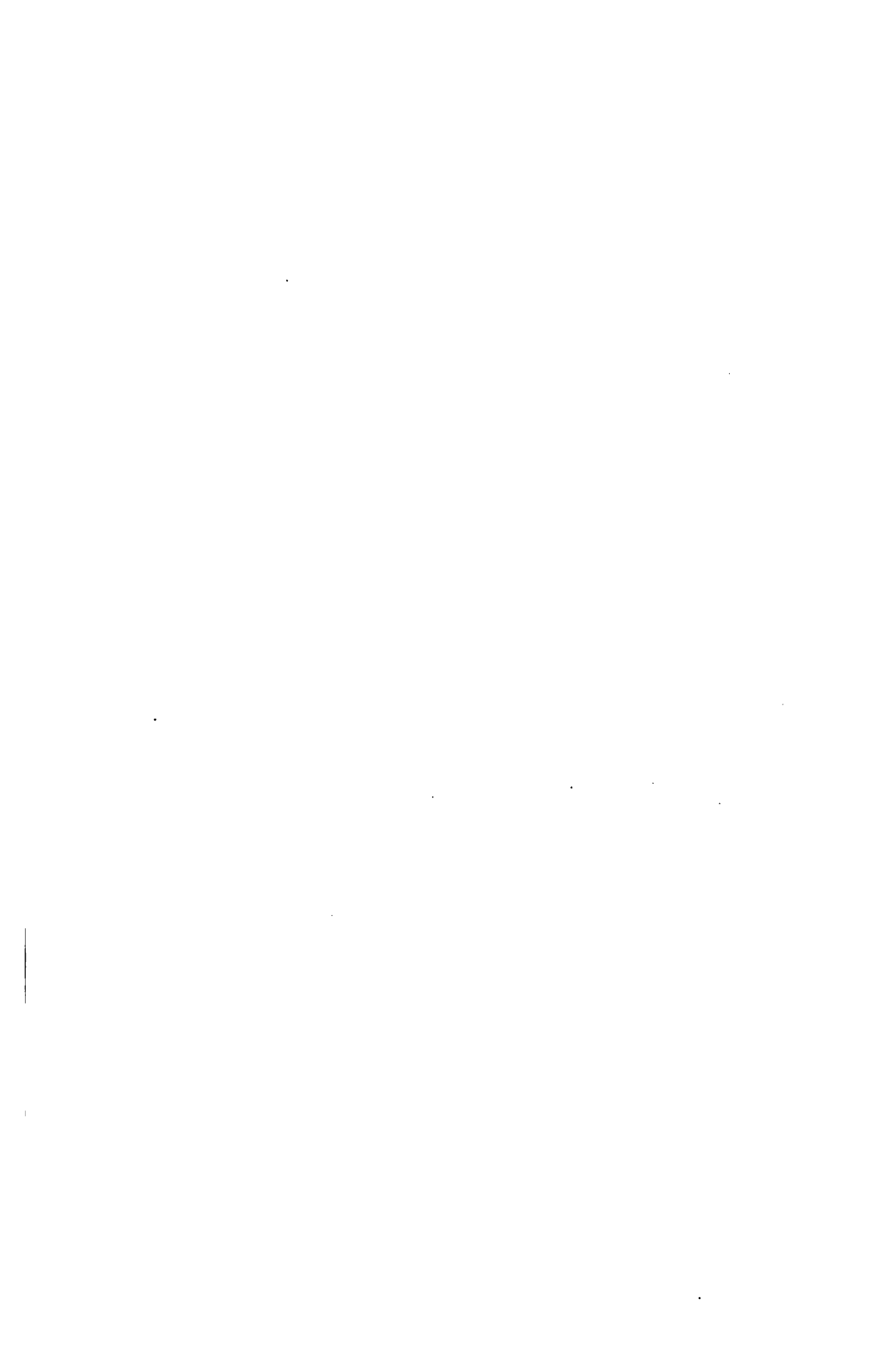
Metchnikoff ²⁶²_{June 25, '96} argues that the facts advanced by Pfeiffer are true, but that it is erroneous to conclude from them that the leucocytes are inactive when closely observed. The peritoneal cavity of guinea-pigs, as is the case with that of many other animals, contains, in a normal state, a greater or smaller quantity

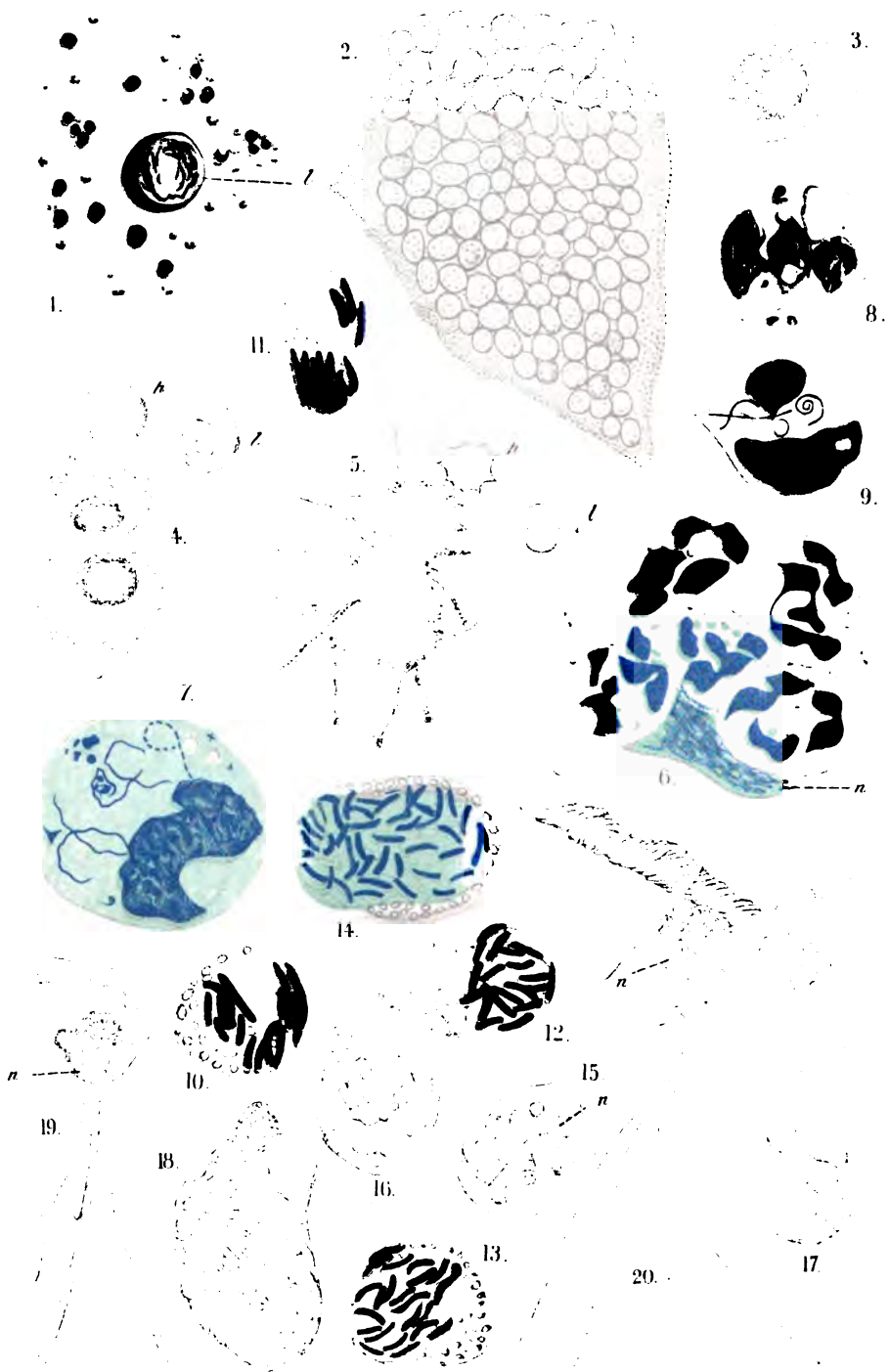
of lymph charged with all sorts of leucocytes. The injection of Pfeiffer's mixture, composed of the serum of vaccinated animals, vibrio cultures, and broth, creates apparent disturbances in the peritoneal lymph. The number of leucocytes diminishes to such an extent that the lymph, although turbid in a normal state, becomes quite transparent. While the small leucocytes remain unaltered, the true leucocytes, polynucleated and mononucleated, accumulate in masses and are deposited upon the surface of the abdominal viscera. The damage to the leucocytes is also manifested by the manner in which nearly all these cells become motionless, many of them presenting signs of degeneration. These injured leucocytes, although incapable of capturing the vibrios, destroy them by their secretions. If the peritoneal fluid be withdrawn a few minutes (two or six) after the injection, the presence of a great number of these weakened leucocytes, each surrounded by an enormous quantity of vibrios in great part transformed into granules, will be recognized.

The part which the leucocytes play in this extra-cellular destruction of vibrios can also be well demonstrated outside of the organism. One has only to withdraw a drop of the abdominal lymph, which is rich in leucocytes, and to add a small quantity of the mixture of the vibrios and active serum at a temperature of 150° C. (302° F.); at the end of a few hours nearly all the vibrios of this drop will be found to be transformed into granules. The endothelial cells are totally excluded, the leucocytes alone being present.

The extra-cellular destruction of bacteria is thus the work of weakened or injured leucocytes. When the cells are stronger, the phenomenon of extra-cellular transformation of vibrios into granules does not take place, but, on the contrary, we see a characteristic phagocytosis. This result may be obtained if we first inject into the peritoneal cavity a few cubic centimetres of bouillon. After a few hours the leucocytes will be found in the peritoneal cavity in great quantities; and if at this moment we introduce Pfeiffer's mixture into the peritoneal cavity, all the injected vibrios are immediately seized by the leucocytes; so that the extra-cellular destruction of vibrios does not take place at all. On the contrary, we observe an intra-phagocytosis destruction of the vibrios, which is even more rapid than the destruction produced in the conditions of Pfeiffer's experiment.

The extra-cellular transformation of bacteria is thus only the episode of the battle between bacteria and phagocytes, which is the general rule of resistance in the animal organism against bacterial invasion. This conclusion is strengthened by the fact





Extra and Intra-cellular destruction of bacteria in the System (Metchnikoff) Annales de l'Institut Pasteur.

that the extra-cellular destruction is observed only in the peritoneal cavity of the higher vertebrates; but if we inject Pfeiffer's mixture into parts of the organism in which phagocytes have not been previously accumulated,—as, for example, into the anterior chamber of the eye or the subcutaneous tissue,—the extra-cellular destruction of bacteria is not at all produced, but there occurs, instead, a very pronounced phagocytosis, conformably to the general rule relating to this phenomenon. The annexed colored plate exemplifies the comparative phenomena outlined.

Explanation of Plate.—Fig. 1. Pfeiffer's phenomenon occurring in the exudation taken from an untouched guinea-pig, the exudation having been withdrawn ten minutes after the injection of 1 cubic centimetre of bouillon containing one loopful of a culture of Constantinople cholera and 0.04 cubic centimetre of preventive serum (of the strength of $\frac{1}{4}$ milligramme). Staining with methylene-blue. *l*, lymphocytes. Ocular 3. $\frac{1}{8}$ Zeiss.

Fig. 2. Mass of granules placed around a collection of leucocytes. Exudation of a guinea-pig withdrawn nine minutes after the injection of 1 cubic centimetre of bouillon to which have been added a third of a culture of Oriental-Prussia cholera and 0.04 cubic centimetre of preventive cholera serum of goat (strength, 0.0002). Ocular 2. D. Zeiss.

Fig. 3. Granular leucocyte surrounded by a zone of vibrionic granules. The exudation was withdrawn twenty five minutes after the peritoneal injection of one-tenth of an agar-agar culture of Massowah vibrio. Ocular 2. $\frac{1}{8}$ Zeiss.

Fig. 4. Two mononuclear leucocytes surrounded by granules; a lymphocyte (*l*) and a red blood-corpuscle (*h*) from the same exudation. Same power.

Fig. 5. The same cells after remaining for three and one-half hours at 26°.

Fig. 6. Five polynuclear leucocytes from the exudation withdrawn four minutes after the injection into the peritoneum of a guinea-pig (highly vaccinated and prepared with 8 cubic centimetres of bouillon) of 1 cubic centimetre of bouillon with one-third of an agar-agar culture of Oriental-Prussia cholera. *n*, nucleus of a crushed macrophage. Staining with methylene-blue. Ocular 3. $\frac{1}{8}$ Zeiss.

Fig. 7. Mononuclear leucocyte filled with Courbeovie cholera vibrios. Peritoneal exudation of a guinea-pig. Ocular 3. $\frac{1}{8}$ Zeiss.

Figs. 8 and 9. Two polynuclear leucocytes from the same exudation. The vibrios stained gray in the plate are vibrios in the eosinophile stage. Ocular 3. $\frac{1}{8}$ Zeiss.

Figs. 10 to 14. Various phases in the formation of cultures of cholera vibrio (Oriental Prussia) within leucocytes. Hanging drop, stained with methylene-blue, of the exudation of a guinea-pig hypervaccinated for almost six months and prepared with 3 cubic centimetres of bouillon. The exudation was withdrawn four minutes after the peritoneal injection of one-third of an agar-agar cholera culture placed in 1 cubic centimetre of bouillon and kept at 38°. Ocular 3. $\frac{1}{8}$ Zeiss.

Figs. 15 to 18. Various phases in the formation of cultures of the Kiel red bacillus within leucocytes. The hanging drop was kept for twenty hours at 17° and was made with the exudation from an hypervaccinated guinea-pig prepared with an injection of 3 cubic centimetres of bouillon. The exudation was withdrawn four minutes after the introduction into the peritoneum of the Kiel bacilli. Ocular 3. $\frac{1}{8}$ Zeiss.

Figs. 19 and 20. Two consecutive phases of a culture of Kiel red bacilli grown from within a polynuclear leucocyte in a hanging drop of peritoneal exudation. The drop was prepared from the exudation of an hypervaccinated guinea-pig, withdrawn three hours and fifty minutes after the injection of Kiel bacilli into the peritoneum. *n*, nucleus. Ocular 2. $\frac{1}{8}$ Zeiss.

J. Bardet, ²⁸²_{June, '96} speaking of leucocytes and the active properties of the serum in vaccinated individuals, says that cholera serum is not antitoxic; vaccinated animals possess no real immunity against the toxin excreted by the vibrio. The serum gives immunity only against the vibrio itself. When fresh it contains two substances,

—one preventive, the other bacteria-destroying. The latter no longer exists in serum that has long been kept or, better still, that has been heated to 55° C. (131° F.); the immunizing qualities still persist, however. The presence of the bacteria-destroying substance is not indispensable in order that the preventive serum may be active, nor is it special to this serum. An untouched or fresh animal, into whose body cholera serum should be injected in order to prevent infection, already possesses such bacteria-destroying substance. What it does not possess is the preventive substance, and it is the latter, consequently, which should be supplied to it. Leucocytes, being living and sensitive-cells capable of reacting, must certainly feel the presence of preventive serum, and, being acted upon by the latter, are able to react by motion. They display a pronounced positive chemotaxis toward preventive serum. It is also a remarkable fact that, when fresh defibrinated blood from a new animal, a small portion of preventive serum, and vibrios are mingled on a glass slip, which is afterward heated to 37° C. (98.6° F.), the leucocytes, even *in vitro*, swallow the bacteria and are often seen to be filled with rounded granulations. Before such facts it is impossible to deny that the serum acts upon the leucocytes as a stimulus, as an excitant to phagocytosis. This, however, is not all the immunity which is conferred by the injections of preventive serum. It leads to the appearance of a bacteria-destroying substance which is very strong as regards the cholera vibrio. This substance, however, is, in itself, unable to cause the death of the vibrio, but, when mingled with fresh serum, acquires new and energetic antiseptic qualities. It is already formed in the fresh serum, and is not produced by cellular secretion when mixture with the preventive serum occurs. Again, it is not uniformly dissolved in the plasma during life, but is, on the contrary, confined to the leucocytes.

Mesnil²⁶²_{V. 9, No. 3; June 29, '95} studied in the fish—the perch, especially—the part played by eosinophile cells in the process of the mechanism of immunity. Anthrax microbes inoculated into the peritoneal cavity were invariably taken into the interior of leucocytes and there destroyed, the microbes when taken into the interior of the cells being still alive and virulent. Eosinophile cells were at no time found either in peritoneal fluid or in the blood, and this both before and after inoculation. It is, therefore, certain, according to Mesnil, that in the perch, at least, destruction of micro-organisms cannot be brought about by bactericidal products secreted by the eosinophile cells. The work supports the views on immunity already enunciated by Metchnikoff.

Debruyne⁷¹⁷_{V. 40, No. 3; Apr. 27, '96}¹¹⁵³ studied the manner by which leucocytes

migrate through the epithelial tissues and perish outside the organism, in this way freeing the organ of those substances which have previously been taken up by them, thanks to phagocytosis. The author concludes that in the lamellibranchia the ejection of leucocytes, all or nearly all containing substances which are known to be formed from degenerating elements, coming either from physiologically active viscera or from foreign substances coming from the outside, is a normal phenomenon which may, under certain conditions, be exaggerated and assume considerable importance. This phenomenon acts as a purifier of the tissues, and is thus to be looked upon as an excretion.

Goldscheider and Müller, ⁵⁴_{v. 18, No. 9} continuing the researches of Werigo and Borrel, who, after the injection of a culture of bacteria into the vein of a rabbit's ear, noted a disappearance of leucocytes in the blood and interpreted this in favor of phagocytosis, studied more closely the relations existing between bacteria and leucocytes. After injecting an emulsion of bacteria into the jugular vein they observed a rapid diminution in the number of leucocytes in the venous blood, while microscopical examination of the viscera showed a great increase in the number of leucocytes in the capillaries of the lungs, liver, kidneys, spleen, and bone-marrow. Increase of leucocytes was also noticed in the small arteries, while in the larger ones but few were to be found. So far Goldscheider and Müller agree with the French writers, but not as to the relations existing between the leucocytes and bacteria. They too discovered bacteria taken up by the leucocytes, but only in the very smallest proportion as compared to free bacteria. They are of the opinion that injections of cultures of bacteria, like injections of spleen or of bone-marrow extract, give rise to an accumulation of leucocytes in the capillaries, and to a diminution in the number of leucocytes in the greater vessels. This induces favorable circumstances in the capillaries for the adhesion of bacteria and for their consumption by the endothelial and white blood-cells, but does not occur to an extent sufficient to afford a proof of the doctrine of phagocytosis.

A. Pochl ⁵⁸⁶_{No. 49, 26} considers the theory of immunity and immunization from the chemico-biological stand-point. Intra-visceral oxidation, or tissue-respiration, at the very least plays a part of some importance in the ability of the system to withstand certain diseases. Under certain conditions free spermin is changed into an insoluble compound, causing a diminution in tissue-respiration. Through this diminished intra-visceral oxidation, insufficiently oxidized products of retrogressive metamorphosis, leucomaines which cause a species of auto-intoxication, accumulate in the

system. This affords a most favorable opportunity for the invasion of infectious germs. In free normal spermin the system possesses a weapon against auto-intoxication. When the blood possesses its normal alkalinity active spermin is formed from the nuclein of the leucocytes destroyed, but when the alkalinity of the blood is diminished there is formed from the same nuclein an insoluble inactive spermin. The essence of immunity is embodied in the white blood-corpuscles and in their consequent destruction during the normal alkalinity of the blood. When the blood is alkaline leucocytosis leads to normal intra-visceral oxidation through the formation of soluble active spermin, and consequently to an increased power of resistance against disease-causing influences,—a property which vanishes with diminished alkalinity. Speaking of the serum treatment, Poehl expresses the opinion that the agent which confers immunity is not to be looked for in a doubtful antitoxin, but in the normal element of the blood, inasmuch as leucocytosis is produced by the simultaneous incorporation of the serum and heightened alkalinity of the blood. This, together with the destruction of nuclein and formation of soluble active spermin causes, in consequence of heightened energy of the visceral respiration, increased resistance against infection. In the author's opinion, spermin, already proposed as a therapeutic agent, causes immunity.

Calabrese, of Naples, ³_{Oct. 20, '06} at the Sixth Congress of the Italian Society of Internal Medicine, also alluded to the modifications in the alkalinity of blood in its relations to artificial immunity. He had immunized animals either with attenuated or virulent cultures or with bacterial or vegetable toxins, and had determined the degree of alkalinity of the blood by means of an exceedingly accurate dosimetric system. He had always found the alkalinity to increase with the degree of immunization, and the former would attain its maximum when the animal had been completely refractory.

The immunized animal reacted toward agents of infection by a moderate, but persistent, increase in the alkalinity of the blood, while healthy non-immunized animals were affected at first by a more or less intense hyperalkalinity of the blood, followed by a fall in alkalinity during the few hours preceding death.

Büchner ³¹⁹_{Nov. 20, '06} also thinks that immunity is not the result of a direct action of the antitoxin upon the toxin, but that both act antagonistically upon the cells of the human system, while Kossel as looking upon the bacteria-destroying power of nucleinic acid as playing a part in the development of immunity. Metchnikoff has become a partisan of this doctrine because it gives a part

to phagocytosis in the acquisition of immunity. Roux likewise looks upon immunity as due to cell-activity. Altogether, the tendency of these and other observers is to give nucleinic acid a preponderating part in developing immunity. The question as to whether the acid acts exclusively as a bacteria-destroying agent or if, by its acidity, it neutralize the toxins, remains, however, unsettled. E. Freund, S. Grosz, and O. Jelinek ⁸¹⁹_{Nov. 22, 1906} call attention to the fact that the evolution of this question has gone through the same phases as the evolution of the question of the mechanism of coagulation. In both cases the blood-serum was first looked upon as the efficacious agent; in both cases it was next seen that the active principle came from the cells, but that, in addition, an important part was played by the salts dissolved in the serum; in both cases it has been found that heating to 56° C. (132.8° F.) prevented the accomplishment of the phenomenon. Thus in both cases it has finally been supposed that the animal organism contains active principles which, under the influence of certain irritating agents, are divided into two substances possessed of antagonistic properties, and that the latter, either by themselves or in a state of combination, provoke or prevent coagulation in one case, in the other give rise to toxic or antitoxic effects, reuniting, under certain circumstances, to reconstitute the original neutral bodies. The authors were led to study the eventual relations of the mechanism of coagulation and of the mechanism of immunization by a consideration of the parallelism existing between the two. They determined to examine what influence might be exerted upon the production of immunity by bodies which favor or prevent coagulation. These researches were partly experimental and partly chemical in nature.

From the researches of A. Schmidt and his pupils it is known that leucocytes play a most important part in the production of the phenomenon of coagulation. Lilienfeld ⁸⁸_{v. 18, Dec. 5, 06} succeeded in extracting from leucocytes a substance which is soluble in water, precipitated by acetic acid, and which possesses the characteristics of being both of albuminoid and nucleinic, and which, therefore, may be classified as a nuclealbumin. The denomination of "nucleohiston" was applied to it. By contact with various agents—such as lye, dilute acids, boiling—this nucleohiston is divided into a nuclein known as leuconuclein, and an albuminoid principle, a real base, which is known as histon. Under the action of strong alkalies leuconuclein sets free nucleinic acid, which itself may be subdivided into phosphoric acid and nuclein. Lilienfeld observed that both nuclein as well as nucleinic acid formed out of the latter possess to a high degree the power of

causing coagulation, while histon possesses quite the opposite property.

The researches of the three authors show that nucleohiston as well as nucleinic acid precipitate from their solutions both the toxin and the antitoxin of diphtheria, while histon does not do so. In addition they succeeded in isolating principles which prevent coagulation, by operating on the product given by the filtration of a solution of nucleohiston which has first been precipitated by hydrochloric acid.

These principles, which possess the power of preventing coagulation, have been examined as to their action upon diphtheritic toxin. It was ascertained that, while neither nucleinic acid nor nuclein possesses the property of neutralizing the toxin, these principles, when injected into the body of an animal previously infected with diphtheria, are capable of neutralizing the effects of such infection. The action was the same as in animals infected with diphtheria and then treated by injections of curative serum. It would seem, then, that these principles are capable of producing therapeutic effects to be compared to those of antidiphtheritic serum. The conclusion may be drawn that an exceedingly close relationship exists between the mechanism of coagulation and that of passive immunization.

Meyer, of Paris, ¹⁴_{July 2, '96} in a study of the question of immunity, inoculated a series of rabbits with the bacillus of diphtheria or of blue pus, and others with serum of divers origins taken from subjects that had been vaccinated against a microbe differing from that used in the inoculations. The progress of the disease was slowed,—a result explained by the fact that the reduction of toxins increased the means of defense, as shown by Bouchard. The toxins seemed to paralyze the vaso-dilators, preventing the migration of the phagocytic leucocytes from the bacteria-destroying, or antitoxic, plasma.

In a second series of inoculations serum taken from the circulation of uræmic patients or from pleural or peritoneal effusions was employed. In these aggravation took place, this being easily explained by the fact that a serum is, in reality, but a solution of toxic products, while, as shown by Charrin and Duclert, organic toxic products aggravate fevers.

J. W. Washburn, of London, ²_{May 11, '96} in a paper before the Epidemiological Society, alludes to the fact that the factors of phagocytosis and of bactericidal substances are common to natural and acquired immunity, to which, in the latter case, that of antitoxins are added. But there are other factors at work,—for example, the low temperature of the frog's blood protects it against tubercle,

and fowls are unaffected by tetanin as they are by morphine. The serum of the white rat destroys anthrax bacilli even out of the body, but its immunity to the pneumococcus could not be thus explained. All such cases Metchnikoff would refer to phagocytosis, but this might occur extensively and yet be followed by death. In the rabbit anthrax bacilli have been seen to escape from within the phagocytes and to multiply outside. Exudation serum is powerfully bactericidal, though the majority of the leucocytes are not phagocytes. In artificial immunity, as that to diphtheria or tetanus, the antitoxin probably neutralizes the paralyzing action of the toxin on the phagocytes, restoring their activity; for the serum of immunized animals is not in itself bactericidal, and the spores of tetanus, if washed from all traces of toxin and inoculated into a susceptible animal without laceration of the tissues, are speedily devoured by the phagocytes.

Buttersack ²⁰_{Nov. 1, '96} ; ²_{Jan. 25, '96} argues that the cure of an infectious disease does not consist in a more or less sudden destruction of the micro-organisms in the body, but in an arrest of their development, the arrest occurring earlier in some individuals than in others. This difference in the time of arrest depends on the difference of reaction to the exciting agent—that is, the micro-organism—in different individuals. The reaction consists of a series of physiological phenomena, and, therefore, being part of the functions of the body-cells, conforms to the general condition of the body, and thus varies with chemical and psychical variations in the body. The variations in the reactions are, however, quantitative, not qualitative. Where fever occurs as part of the reaction, there is a change of the entire economy of the system; such a change of conditions will produce arrest of development of the micro-organisms, unless they can rapidly adapt themselves to the altered conditions. This power of adaptability is limited, at any rate, in rapidity. The author suggests that where the reaction is profound the resisting power of the cells manifested in the reaction remains more or less permanent,—acquired immunity. This power, unless exercised frequently, may be lost; hence, where epidemics occur at long intervals more people are liable to be attacked.

Toxins and Sero-therapy.

As regards the actual part played by antitoxins in sero-therapy, Calmette ¹⁴_{Nov. 30, '96} states that, although twelve months have passed since Roux read his memorable communication before the Budapest Congress, the same conclusions would be arrived at to-day,—namely: 1. Antitoxic serums do not destroy toxins; they neutralize them by a process which is in nowise chemical; toxins and anti-

toxins continue to exist, side by side, in a mixture whose curative properties can be revealed only by a living reagent. 2. Antitoxic serums do not destroy the bacteria which produced them, while they may, according to circumstances, diminish or increase the virulence of such bacteria *in vitro*. 3. Antitoxic serums give rise either locally or throughout the system of the infected subject, to a leucocytosis which stimulates all the functions of phagocytosis in the organism. While studying the conditions favoring toxicity of the blood, it might, perhaps, be possible to unravel those that give rise to its antitoxic power. In the first place, what are the toxic elements of the blood? Mairet and Bosc have shown that the coagulating properties of the blood are destroyed by heating to 59° C. (138.2° F.) and that its toxic qualities alone persist; on the other hand, if the serum be dialyzed, the liquids passing through the dialyzing membrane are harmless; consequently the active principle of the serum must be contained in the albuminoid substances which remain upon the membrane. These substances, whose toxic power has been noted in several infectious diseases by Rumme and Bordoni, must contain, in a latent form (ready to enter into action at any moment), the forces necessary to excite the cells to manufacture the defensive principles which are called antitoxic. The proof of this lies in the fact that during the active state of infectious diseases the toxic power of the serum is low, while it becomes enormous during a fall of temperature. What does the blood contain at this moment, except a considerable amount of elements of disassimilation, of waste products of nutrition, which will be excreted by the various emunctories in such a way as to leave the system in full possession of its antitoxic power? The latter can be but the product of elements of intense vitality derived from the internal glands,—liver, spleen, suprarenal capsules, thyroid gland,—whose rôle has been described as being so useful in maintaining the equilibrium of nutrition. This is all the more probable from the fact that the ferments contained in these glands are peptalbumins of the variety that Bouchard shows to be necessary for the phases of organization and assimilation of cells. However that may be, the phenomenon that is contemporaneous with the formation of antitoxins consists in an enormous production of white corpuscles, in an exaggerated leucocytosis, which, through phagocytosis, will become the most powerful destructive agent of bacteria, as Metchnikoff and his pupils have shown it to be the case in all infections. Leucocytosis is the means which the system uses to rid itself of all toxins which may be detrimental to its soundness,—bacterial toxins (diphtherin and tetanin), vegetable toxins (ricin and abrin), and animal toxins

(serpent-venom). Moreover, Kobert, of Dorpat, has observed that mineral substances, such as iron, are mainly arrested by the liver, the spleen, and the bone-marrow through the leucocytes, which there take them up and carry them to the intestines, whither they are impelled by a force as yet unknown. (For the serum-therapy of diphtheria, see vol. i, section H.)

Three years ago Roger ⁹¹_{May, '96} ²_{June 15, '96} showed that cultures of streptococci contain two antagonistic substances, one of which diminishes, while the other increases, the resistance of inoculated animals. The former is destroyed by heat; so that with a culture raised to a temperature of 230° F. (110° C.) animals can be vaccinated against streptococcic infection. The serum of animals thus treated acquires the property not of destroying, but of attenuating the microbes which are introduced into them and of checking the infection set up by virulent cultures. Serum taken from a mule which had been extensively injected with sterilized cultures was used on a woman suffering from puerperal fever. After unsuccessful injections of 8 and 16 cubic centimetres (2 and 4 fluidrachms), a third injection of 25 cubic centimetres (6½ fluidrachms) on the third day was followed by defervescence of the fever and rapid recovery. Three other cases have since been published by Charrin and Roger. ⁹²⁷_{Mar. 20, '96} The first of these was also one of puerperal fever. Injections of serum amounting to 40 cubic centimetres (10 fluidrachms) were followed after the third day by speedy defervescence and cure. An infant, 21 days old, suffering from erysipelas of the face, recovered after a single injection of 5 cubic centimetres (1½ fluidrachms) of serum. In the third case, which was one of streptococcic pseudomembranous angina with very serious cardiac symptoms and a temperature above 104° F. (40° C.), a single injection of serum was followed by recovery in the course of thirty-six hours. The author, though unwilling to draw any definite conclusions from this small number of cases, is hopeful of future success from commencing the treatment early and introducing large quantities of serum.

This year an important step was made in the same direction by Marmorek, ²⁶²_{July, '96} who showed that streptococcic serum was not only curative, but prophylactic as well. The most efficient culture-medium he found to be a mixture of human blood-serum and bouillon. By growing streptococci alternately on this medium and in the tissues of rabbits during a period of two months, he obtained cultures of extraordinary virulence—so virulent that a fraction of a millionth of a cubic centimetre is inevitably fatal to a rabbit, producing a rapid septicæmia with enormous numbers of streptococci in all the organs. By the subcutaneous injection of

these virulent cultures—not of their toxins, as is the method in the case of diphtheria and tetanus—he has been able to develop a high degree of resistance in the horse and ass. After injections carried on for about six months the blood-serum of these animals is found to have protective and also, though to a less extent, curative powers. As an example, he found that such a serum, in the proportion of $\frac{1}{7000}$ of the body-weight, would protect a rabbit from the subsequent inoculation of ten times the lethal dose of virulent culture. The action of the serum would appear to be chiefly in the direction of aiding the arrest of growth of streptococci in the body, as when tested along with the toxin of a virulent streptococcus its antitoxic power is not great. Another point of importance ¹⁵ is that Marmorek considers that all the streptococci pathogenic to the human subject are of the same species,—*e.g.*, that the streptococcus of erysipelas and of suppuration are one and the same. He has found that streptococci from the most varied conditions can be brought by his method to the same degree of virulence, and made to produce similar effects in animals. His results go to establish the view that the lesion in the human subject depends upon the point of entrance and the degree of virulence which the streptococcus possesses. The serum has been used in numerous diseases caused by the streptococcus,—namely, erysipelas (423 cases, with a mortality of 3.87 per cent.), angina, phlegmon, and other septic processes. The patient's general condition was advantageously influenced, the temperature being lower and the redness, swelling, and albuminuria being less. In the gravest cases a dose of 20 cubic centimetres (5 fluidrachms) was injected, followed by 10 cubic centimetres (2½ fluidrachms) next day, the maximum dose amounting to 120 cubic centimetres (4 fluidounces). Among seven cases of puerperal fever no death occurred, whereas it was given without benefit in cases which were complicated with bacterium coli. Very gratifying results have also been obtained in cases of phlegmon and of pseudomembranous angina caused by the streptococcus.

Roger, ¹¹⁵³ Aug. 14, '96 alluding to the two great theories which have been set forth,—one maintaining the phagocytic power of leucocytes, the other the bacteria-destroying power,—states that his first researches carried out with the streptococcus were not at all favorable to the second idea; he noted, in fact, that the bacteria developed with as much ease in the serum of vaccinated animals as in the serum of fresh animals. However, carrying on still farther his experiments in this line, he found that bacteria coming from the serum of vaccinated animals had lost the greater part of their virulence; they were, in fact, attenuated. Without denying the

result, it was objected that, in his experiments, no attenuation occurred, but rather a therapeutic action exerted by the serum injected at the same time as the bacteria.

The objection was valid, but was refuted by new researches. He inoculated three rabbits: one was given a culture of streptococcus and died in three days; the second received the same amount of culture, and, in addition, 1 cubic centimetre (15½ minims) of serum from a vaccinated animal (this one died in five days); the third was given the same quantity of culture and serum, but after the animals had been mixed; it either survived or died very late. Therefore, the author concludes that the serum does not act upon the system, but especially upon the microbe. Roger, however, is far from denying the therapeutic action of the antistreptococcic serum, but he thinks that this action is explained by his experiments,—i.e., due to the attenuating action of the serum.

The power of attenuation is not a property of the serum only; it belongs to the living blood as found in the vessels. By repeating the same experiment as with the serum, and using blood which is so rapidly transfused (in ten or fifteen seconds) that it has not the time to undergo the slightest change, exactly the same results are obtained. These experiments throw light upon the mechanism of immunity, as did the former experiments upon the therapeutic action of serum; it is now easy to conceive how microbes falling into vaccinated blood rapidly lose their harmful influence by contact with it and become an easy prey to phagocytes.

Parascandolo, ⁸⁷⁶_{v. 40, N. 4} after numerous experiments, finds that, with an antitoxic serum prepared by a method similar to that of Roux and Yersin, but shortened somewhat, he is able to cure or to immunize animals exposed to streptococcic and pyogenic infection. The cultures, at first acid, acquire their highest toxicity later, when they become alkaline. The cocci were best cultivated in a saccharated broth. Dogs and rabbits are the best subjects. The immunity is not permanent. The serum of the immunized animals has a neutralizing property *in vitro*. Intra-uterine injections of cultures of streptococcus erysipelatis gave rise to no pathogenic result if the mucous membrane were intact, but, if this were previously wounded by mechanical or chemical means, then similar injections gave rise to symptoms of puerperal fever. Further, injection of anti-erysipelatus serum had a curative and preventive power against puerperal febrile processes unless these were so far advanced as to poison the whole organism.

In a study of the effect of filtered cultivations of the staphylococcus pyogenes on the serum of the blood, Courmont, of Lyons,

together with Rodet, ⁴¹⁰_{Jan., '96}, ²¹³_{Mar.} found that in bouillon cultivations of staphylococcus pyogenes two sets of soluble substances are formed, one of which, soluble in alcohol, has a protective effect after inoculation, while the other, insoluble in or precipitated by alcohol, gives the reverse effect,—a predisposition to the effects of the micro-organism. In the ordinary mixture of these the predisposing substances predominate while the vaccinating, or protective, substances are masked, and their effects only appear after separation with alcohol. The substances precipitable by alcohol have, moreover, toxic properties antagonistic to those of the substances soluble in alcohol. It is thus possible, with the aid of alcohol, to extract from a given culture of staphylococcus pyogenes a vaccinating and a predisposing material, and to prepare two sets of animals, one of which is vaccinated against the staphylococcus pyogenes, the other predisposed to it.

Courmont has also shown that the serum of the rabbit, vaccinated against infection by the staphylococcus, exercises a marked attenuating effect upon the staphylococcus apart altogether from the cellular action of the organism. On the other hand, the serum of a predisposed animal favors the growth of a specially virulent staphylococcus; it weakens the natural attenuating properties of normal serum and even renders this liquid more favorable for the cultivation of the microbes than ordinary bouillon, for a microbe which, cultivated in bouillon, no longer kills a rabbit, becomes again virulent when cultivated in the predisposed serum.

Suppuration.

W. Poliakoff ⁵⁰_{v.16, Nov. 2, '96}, ¹²⁶_{Jan. 15, '96} states that the first bacteriological researches led to the opinion that all suppuration was due to microbes; later on it was perceived that animals inoculated with sterilized cultures of bacteria suffered from true abscesses; finally, identical results were obtained by means of subcutaneous injections of sundry irritating chemical products. Turpentine, croton-oil, mercury, nitrate of silver, and sterilized culture-bouillon also gave rise to suppuration containing no bacteria.

Poliakoff first ascertained that, even when taking every aseptic precaution, controlled by bacteriological examination, abscesses containing sterile pus could be produced in the dog and rabbit by means of turpentine and of croton-oil. He then endeavored to ascertain whether such pus differed from that contained in abscesses produced by bacteria. He states that authors who maintain that pus differing in cause also differs in its characteristics state that (1) suppuration of microbial origin tends to extend, that of chemical origin remains stationary; (2) pus of microbial origin

is composed of pus-globules containing numerous nuclei, while that of chemical origin is formed of pus-cells containing but one nucleus; and (3) pus of bacterial origin contains peptones, that of chemical origin contains no peptones.

Poliakoff has found these propositions to be false, his experiments showing that in both cases the pus possesses identical qualities. The system reacts in the same manner against sterilized cultures and irritating chemical agents: a small amount of either, injected in an unadulterated form under the skin, produces no effect; if, on the other hand, it is introduced under the skin inclosed in a small bladder of celluloid, which melts slowly, a veritable abscess is caused. It is probable that a slow and continued secretion of pyogenic products is required to cause suppuration,—a result due to the toxins given off by the bacteria.

P. Kaufmann, of Cairo, ⁵⁰_{Sept. 24, '96} criticises Poliakoff's article on suppuration with and without bacteria. He states that Poliakoff has forgotten to mention either Ruy's, Brewing's, Biondi's, Knapp's, or his own researches. Poliakoff simply repeats the researches which already had been made before him. In his thesis published at Leipzig in 1889 Kaufmann brought into notice an eminently pus-producing agent,—digitoxine,—which with but 0.003 gramme ($\frac{3}{84}$ grain) causes swellings and abscesses of some size in dogs, and which must, consequently, be looked upon as especially suitable for experiments destined to solve the question of the existence or non-existence of aseptic suppuration. Kaufmann used in his experiments a 1 to 1000 solution of digitoxine, which was equal to 3½-per-cent. carbolic-acid solution. He thus used a rather strong disinfecting agent. By these means and also through his former experiments, in which he almost overdid the use of antisepsis, he almost irrefutably, or, at least, much more surely than had hitherto been the case, proved the existence of aseptic suppuration.

Roger and Josué, of Paris, ¹²⁶_{Oct. 15, '96} also argue that suppuration is nowise specific. It may be caused by bacterial toxins or even by aseptic chemical agents. Two varieties of causes favor the production of pus,—general causes (poisoning by products introduced by accident into the system, formed there, or secreted by bacteria) and local causes. The following experiments illustrate the latter: 1. Action of certain chemical substances. The inoculation of $\frac{1}{2}$ cubic centimetre ($7\frac{1}{2}$ minims) of bacterium coli, following upon the injection under the skin of 0.5 gramme ($7\frac{1}{2}$ grains) of trimethylamin or of 0.05 gramme ($\frac{1}{4}$ grain) of carbolic acid dissolved in 1 cubic centimetre ($15\frac{1}{2}$ minims) of water, gives rise to diffuse cellulitis. Injections of weak doses of carbolic acid exerts neither a good nor an injurious effect. 2. Liga-

ture of the femoral artery or of the external iliac artery. After this operation injections of staphylococcus aureus, of bacterium coli, of proteus vulgaris, and of streptococcus were made under the skin. With the exception of two rabbits which died without any local lesion, having been given doses of a too virulent streptococcus, and of another rabbit which was inoculated with an old culture of bacterium coli retaining but little virulence, all the rabbits whose arteries were ligated suffered from extensive, diffuse cellulitis, while rabbits inoculated in the same way, but whose arteries were not tied, were affected only with small circumscribed abscesses. 3. Ligature of the veins. Ligature of the femoral veins did not give any decisive results, the circulation being too easily re-established through the numerous anastomoses connecting it with the veins of the pelvis and of the abdominal walls. When, however, the three veins at the basis of the rabbit's ear were tied and an inoculation of proteus vulgaris made into the cellular tissue of that organ, a gangrenous phlegmon with marked tendency to death of the tissue was formed. 4. Section or pulling out of the great sciatic nerve. No definite result ensued. Injection of toxins of the proteus vulgaris produced an aseptic abscess.

The question of the unity of streptococci can be settled only by the bacteriological examination of pure streptococcic infections in which transformation from one state into another has occurred naturally. Petruschky⁹³⁰ cites ten such observations: in five erysipelas was secondary to other infections by the streptococcus, while in the five others a primary erysipelas had brought about the formation of subcutaneous suppuration, completely removed from the atmosphere. Petruschky has endeavored by experiments upon animals to prove the identity of the streptococci of erysipelas and of those of suppurations of other causes; he always succeeded in obtaining erysipelas of the rabbit's ear by the use of streptococci of various sources. He concludes that there are to be found purely streptococcic infections in which a primary focus of suppuration directly causes true erysipelas; the streptococci of such erysipelas possess the same degree of virulence as those of the focus of suppuration. Inversely, there are foci of subcutaneous suppuration proceeding from a primary erysipelas and due to the same streptococcus. All morbid processes due to the streptococcus possess the common characteristic of giving a thermometric curve which is characteristically remittent.

V. Babès and Broca¹⁰⁴⁵ ask whether one or more species or natural varieties of streptococcus exist. It is impossible to refuse to recognize the close relationship existing between its various forms, yet it may be looked upon as allowable to admit the exist-

ence of distinct groups. The classification of Behring and others who consider only the length of the chain should be set aside and the general sum of all the properties should serve as a basis. G. H. Lemoine, of Paris, ⁹²⁷_{Dec. 21, '96} states that of forty-two specimens of streptococcus, eight of which were taken from erysipelas patches, two streptococci, which at first were decolorized by Gram's method, later on were no longer decolorized by alcohol after cultivation on agar-agar. Two streptococci of erysipelas produced very well marked cultures on potato, but at the end of eight to ten months they were no longer capable of growing on that medium. Finally they acidified milk. In short, the characteristics which have been considered by some observers to justify the separation of certain species—namely, decolorizing by Gram's method, growth on potato, and acidification of milk—vary with the same species, and are not sufficient to warrant a farther separation of species.

Etienne ⁴⁵⁷_{v. 12, No. 4, '96} publishes an article on streptococci decolorized by Gram's method. In a case of diphtheroid angina with thick, gray, and rapidly-growing pseudomembranes, bacteriological examination revealed the presence of a peculiar variety of streptococcus. Cultivated on potato, it gave a visible growth, like the specimen examined by Marot; but what was more curious was the fact that the streptococcus, studied with care, was always easily decolorized by Gram's method, whether when found in the pseudomembrane or when in the form of chains taken from the cultures. Similar characteristics have already been noted in streptococci taken from a pelvic abscess and from a case of contagious mammitis in the cow. These facts should be borne in mind while an endeavor is being made to collect all streptococci into one single species varying only in secondary details.

C. Parascandolo ⁵⁸⁹_{p. 254, '94} ⁵⁰_{Sept. 24, '96} publishes the results of a second series of comparative bacteriological researches on the streptococcus pyogenes, streptococcus erysipelatis, and on a streptococcus separated from the blood of eight patients suffering from pyæmia. Since the morphological and biological characteristics of these three varieties of streptococcus give but little ground for their distinction, Parascandolo examined their biochemical properties, thinking that in this way some distinctive mark might be discovered. These researches were directed toward the behavior of the three varieties with regard to certain colored culture-media, their power of forming acids or alkalies, and their behavior in connection with certain substances added to the media, such as sodium sulphindigotate, jequirity, salol, iodoform, urea, hippuric acid; the formation of certain products of exchange, such as indol, sulphuretted hydrogen, urea, creatinin, xanthin, leucin

and tyrosin, lactic acid; and finally the behavior of the three bacteria with regard to the addition of grape-sugar, the latter by polariscopic examination of the nutrient medium employed (2-per-cent. solution of peptone to which 2 to 5 per cent. of grape-sugar had been added). The differences noted in the results consisted in that the streptococcus taken from the eight patients suffering from pyæmia differed from the others as follows: 1. In opposition to what occurs with the other two, it does not form acids, but gives rise abundantly to alkalies in great quantity. 2. It reduces sodium indigosulphate. 3. It can produce neither lactic acid nor sulphuretted hydrogen. 4. Finally the polariscope shows that it decomposes the nutrient medium to which grape-sugar has been added, much less than do the other two varieties. On account of these differences Parascandolo thinks that his streptococcus must be separated from the others.

Walter Reed, U. S. A., ⁹⁹_{Oct. 4, '94} reports the case of a patient who died of croupous pneumonia; bacteriological examination discovered that, in addition to a local infection of the lung with diplococcus lanceolatus, there was a general infection of the organs with streptococcus pyogenes. While the patient did not exhibit any symptoms whatever of erysipelas during the course of the fatal pneumonia, the physician who performed the autopsy, accidentally infecting a flesh wound of his hand with the fluids of the cadaver, experienced a local infection, which was rapidly followed by a general infection of the system, the latter expressing itself in the form of well-marked facial erysipelas. This physician had never had a prior attack of erysipelas. The time between the local infection and the appearance of the disease was four days. The case is regarded by the author as showing the probable identity of streptococcus Fehleisen and streptococcus pyogenes.

Heim ³⁴⁹_{V. 26; July 15, '96} ¹²⁶_{Oct. 4, '94} considers the subject of the streptococcus longus pyothoracus. He states that white mice are the best animals on which to study it. The most remarkable effect of this micro-organism consists in the destructive influence which it produces upon the glandular parenchyma, which loses its aptness to take up aniline dyes, while the connective tissue is filled with streptococci. The spleen, which is enlarged, contains yellow dots which are visible to the naked eye and which correspond to foci of splenic cells which have undergone the same transformation; at the borders of the lesion are to be found microscopical collections of streptococci with prolongations extending into the as yet unaltered tissue. The liver also is enlarged, but contains fewer yellow points. Along the walls of its veins exist deposits of leucocytes, some of which contain streptococci which they have taken up and which are

undergoing multiplication. Streptococci are contained in the urine, this being due to a more or less marked alteration in the kidney. They are to be found scattered here and there in the walls of the stomach and intestine and in the lungs and brain. No pleurisy is caused when inoculation is performed under the skin at the root of the tail. The testes, which are much affected, contain streptococci only in their connective tissue. None were found in the embryos of a mouse dying from the infection. Experiments as to immunity failed completely in mice and succeeded only in rabbits by means of sterilized cultures. Adult rabbits were immunized by an inoculation which had merely intoxicated them.

J. Petruschky ⁵⁰ ¹²⁶ states that the streptococcus, which so soon loses its vitality and virulence under ordinary circumstances, retains these two qualities for a long time, if kept in a refrigerator. Under such conditions he has seen two specimens of streptococcus give, at the end of six months, cultures which were as vigorous and as virulent toward rabbits as they were at their first culture.

Bacillus Pyocyaneus.—A case is reported by Salus ²¹³ ^{Apr., '96} in which the bacillus pyocyaneus imparted a green color to the fæces. A woman, aged 26, underwent laparotomy for the removal of an ovarian tumor. On the breaking up of adhesions the wall of the gut was injured so that a fæcal fistula formed at the lower angle of the wound. About two weeks after the operation it was noticed that the fæces which stained the dressing were green in color. Fresh portions of fæcal matter were obtained, after careful washing of the wound, for bacteriological investigation, and pure cultures and subsequent inoculations in animals disclosed the presence of large numbers of the bacillus pyocyaneus. Kossel ⁵ ^{Jan., '96} reports a case in which the same bacillus was the cause of green diarrhoea in an infant 4 weeks old.

Monnier, of Nantes, ³ ^{Aug. 22, '96} reported a case of generalized pyocyanic infection in man. The patient, aged 53 years, was suffering from broncho-pneumonia of the common type. Five days after entering hospital he died, and the post-mortem examination revealed, besides the lesions of broncho-pneumonia, purulent pleurisy and a parietal endocarditis of the left heart simulating an aneurism at the apex of the heart. While the patient was still living Monnier had discovered the bacillus pyocyaneus in the sputa. The same micro-organism was found in the broncho-pneumonic lobules, in the pus of the pleural cavity, and in the coagula in the heart. He was able to obtain a colored growth with it, and, after increasing its virulence by inoculation of a rabbit, he obtained with it hæmorrhages of the gastro-intestinal canal,

and especially punctate hæmorrhages in the stomach. He also succeeded in obtaining the pyocyanic reaction and crystals of pyocyanin. It may be concluded from the foregoing observations and from those already published that in human pathology the bacillus pyocyaneus plays a more important part than has been thought until now. It gives rise to local phenomena (blue pus) and to phenomena of a general nature, following the example of the streptococcus, staphylococcus, etc.

Charrin ⁸³_{Aug. 28, '96} stated that observations of pyocyanic infection analogous to the one quoted by Monnier have become more numerous, especially in children. The same author ⁸²⁷_{June 19, '96} found, in a purulent pleurisy of great severity in a woman who had recently given birth to a child, pure culture of the proteus vulgaris. He considers that it should be classed among the pathogenic microbes, as such properties have been ascribed to it in abscesses, angiocholitis, etc.

C. Brünner, of Zurich, ⁸⁴_{Nov. 22, '96} publishes an article on the pathogenic effects of the proteus vulgaris (Hauser) and its relations with infection of wounds. He states that opinions are divided as to the question of the pathogenic action of proteus vulgaris in animals used for experiments, although the infectious action of the micro-organism in the bodies of animals appears to be proved by the coinciding results of the researches of different observers. In man too some observations seem to imply an infectious action, not only a toxic one. He saw a man, 28 years old, suffering from a phlegmon of the left thumb, caused by the introduction of a splinter of wood under the thumb-nail. Clinically, no symptom previous to incision gave reason to suspect any uncommon etiology, but, on incision, the sanious condition and intense odor of the pus were most remarkable. Bacteriological examination of the pus revealed masses of proteus vulgaris (Hauser), besides a few streptococci. Experiments on animals, made with pure cultures of the former, produced not only toxic action, but also infection. Brünner thinks that in this case the proteus, although it penetrated simultaneously with the streptococcus, played only a secondary part, as Hauser had already maintained, inasmuch as it caused a sanious suppuration in place of the necrosis-forming and pyogenic action of the streptococcus.

Chiari ⁸⁸_{Nov. 24-27, '96} ⁶¹_{Nov. 2} described a case of pyæmia following an ascending suppurative nephritis in which the bacteriological examination demonstrated the presence of a capsule bacillus as the etiological agent. The post-mortem examination showed, in addition to certain old changes, suppurative nephritis, suppurative prostatitis and cystopyelitis, acute endocarditis, and finally an

otitis media and a meningitis. In all these foci was found a bacillus which showed a distinct capsule. This bacillus was pathogenic for all ordinary animals used for experimental purposes. Rabbits were most resistant. Subcutaneous injection produced suppuration; intra-venous injection caused a rapidly fatal septicæmia; injection into the kidneys caused suppurative nephritis with consecutive septicæmia. In guinea-pigs the intra-abdominal injection caused diffuse peritonitis and death in twelve hours. Mice died very soon after subcutaneous injection at the root of the tail. This bacillus did not lose any of its virulence after repeated cultivations. It was not stained with Gram's method; it grew rapidly in high glycerin-sugar-agar, producing abundant gas. It was distinguished from the Friedländer pneumonia bacillus by certain cultural peculiarities, by being markedly pathogenic for rabbits, and by being fatal to mice after subcutaneous injection. Sections from the diseased organs showed that it had a close relation to the morbid processes, and that its presence could not be referred to post-mortem invasion. In all likelihood, the point of entrance was the urethra; hence the cystitis, the prostatitis, and the ascending nephritis. From the suppurating foci in the kidneys the bacilli invaded the blood and caused the endocarditis, the meningitis, and the otitis.

Wright and Mallory⁵⁸ ¹¹⁷⁰_{v.20,p.220,'96; Jan., '96} describe a bacillus isolated from the pus of broncho-pneumonia in a man of 40 years. It grew readily upon agar, bouillon, and potato; did not liquefy gelatin; produced coagulation in milk with the formation of an acid reaction. It was non-motile, did not form spores, and stained by Gram's method very slowly. They differentiate it from the pneumobacillus of Friedländer, and consider it identical with the bacilli described by Marchand in croupous pneumonia, Paulsen in atrophic rhinitis, Abel in simple ozæna, Mandry in the bronchial secretion of a paralytic, Dungern in septicæmia in an infant, Nicolaier in suppurative nephritis, Fasching in the nasal secretion in influenza, Mori in canal-water, and Pfeiffer in a guinea-pig which died spontaneously.

E. Wicklein⁵⁰ ⁵⁰_{B.18,p.225,'96} described a similar bacillus in a case of chronic liver-abscess with perforation into the right lung, chronic purulent cholecystitis with perforation into the abdominal cavity, and chronic diffuse peritonitis. The liver-abscesses, gall-bladder, and peritoneal cavity contained abundant thick gelatinous material which on microscopical examination proved to consist essentially of bacilli with well-developed capsules. The bacilli were isolated from these various locations.

Under the term "saccharomycosis hominis" Busse²⁰ ⁷⁵_{B.140,p.23; Dec., '96}

describes a form of chronic pyæmia in which he believes the causal agent to be a form of torula. In the case observed by him the affection began as a local abscess over the tibia, but this was followed by secondary abscesses in internal organs, and a fatal result occurred after a course of several months. In the original abscess he could not find any of the ordinary pyogenic organisms, but numerous yeast-like parasites were observed, partly lying free in the pus, partly contained within giant-cells, of which there were many present. The same organisms were found post-mortem in all the secondary abscesses. He obtained pure cultures, and found that they produced in certain animals inflammatory swellings which sometimes suppurated, but a spontaneous cure ultimately followed. Subcutaneous injections in white mice, however, were rapidly fatal, the organisms becoming generalized in the blood.

Charrin, of Paris, ¹⁴_{June 12, '96} states that bacteria are not the only morbid causes pertaining to the vegetable kingdom which attack the human system. On several occasions the *oïdium albicans*, or thrush parasite, has been observed in the different viscera, far from the atmosphere, and Charrin himself saw it in an abscess in a woman recovering from childbirth.

Under such conditions Charrin and Ostrowsky have made a study of the processes employed by this parasite to create disease, comparing with one another the pathogenesis of affections. Placed under the skin, it may cause the formation of pus; it is affected by phagocytosis and the germicide condition of the liquids of the system. Injected into the blood, it gives rise, by its passage through the walls of the intestine, to a gelatinous diarrhœa,—a fact explaining the pseudomembranous enteritis occurring in man. By its secretions it exerts a slight influence upon the temperature. It acts especially by directly injuring the tissues, by obstructing the vessels, by perforation of the membranes, the kidney, and the intestines. It also acts by giving rise to auto-intoxication; by destroying the permeability of the kidney, giving rise to uræmia, and the following symptoms are observed: Albuminuria, lowered temperature, diarrhœa, bronchial and pulmonary disturbances; urinary toxicity, at first increased, then diminished; increased toxicity of the serum, contracted pupils, etc.

Bacteria act especially by means of the products they secrete; they do little by themselves; they also do harm by injuring the viscera. It is easy to perceive the analogies as well as the differences, for the *oïdium albicans* does but very little harm by the products which it secretes, while its direct mechanical action is considerable, and it likewise effects an injurious action upon the liver and the kidney.

The *oïdium albicans* grown *in vitro* is favorably affected by sugar, but has no affinity for glycogen. It grows with difficulty in the liver, which proves that this viscus does not contain any appreciable amount of free glucose; bacteria are often numerous in the liver.

The *oïdium albicans* is affected by sugar, by the quantity in question, by the mode of entrance, by antiseptics, by the species of the animal; it favors secondary infection; it causes an increase in the power of resistance when it is inoculated in an attenuated form under the skin.

In short, parasites of this order give rise to diseases, symptoms, and lesions by means of processes which at times are similar, at times dissimilar, to those of bacteria; from other points of view, too, it displays analogies with bacteria as well as differences from them.

Septicæmia and Pyosepticæmia.

A. Nannotti⁵⁰_{Mar. 23, '96} describes the results obtained from inoculations of the sterilized products of pus in septicæmia. They are as follow: 1. Sterilized products of suppuration show almost the same poisonous effects as the sterilized products of cultures of staphylococci. 2. Small, repeated injections of such products give rise to chronic poisoning and marasmus. 3. Inoculation into the subcutaneous tissue causes a more intense poisoning. 4. Appearances and alterations in the viscera brought about by such treatment are identical with those which it is customary to find in individuals suffering from chronic suppuration.

Etienne, of Nancy,¹⁴_{Sept. 11, '96} states that pyosepticæmias, though generally infectious, often show a tendency to concentrate, as it were, their action on some system whose lesions seem to attract them,—namely, pyosepticæmias of an osseous type (osteomyelitis), articular pyosepticæmias (infectious pseudorheumatism), cardiovascular pyosepticæmias (acute endocarditis and aortitis), cutaneous types (infectious polymorphous erythema, purpura), etc. At times the symptomatology is more diffuse. The author saw a case characterized by pseudorheumatism, broncho-pneumonia, nephritis, endocarditis, laryngitis, urethritis, and polymorphous erythema. In some cases, which appear to be less frequent, the infection may not seem to attack any special system during its evolution. Its presence is revealed only by very serious general symptoms, as in the following cases: In a woman of 23 years the affection began in June, 1894, by fatigue, loss of appetite, headache, repeated violent rigors, and bilious vomitings; the general state grew gradually worse, though no viscus appeared to be especially affected,

except that after a month and a half a slight increase in size of the liver and spleen was noted. The temperature was much increased with excessive oscillations. A slight decrease in the symptoms was observed from the 15th of August onward and the patient finally recovered after a very long convalescence. The second case was that of a laborer, aged 42, in whom the infection first showed itself by fatigue, then by fever and prostration; the general state was very serious. During convalescence a generalized furunculous eruption and a phlegmon of the thoracic wall appeared, followed much later on by an osteitis of the femur. Here too nothing was to be found in the viscera. In both cases the diagnosis of pyosepticæmia, which was made by clinical observation, was several times verified by the presence of staphylococci aurei and albi in the blood.

Pfister ²²⁶ ⁵⁰ _{v. 49, No. 1; May 21, '96} gives a description of a case of septicæmia which resembled pyæmia. Post-mortem examination showed, in the first place, wide-spread suppuration in the muscles, with abscesses in the myocardium, subperiosteum and subcutaneous tissue, slight pleurisy, purulent arthritis of the knee, metastatic ophthalmia and præpatellar bursitis, and parotitis. Streptococci were found in all collections of pus. At the examination of the kidneys it was noted that the greater part of the cocci were found in the straight tubes, with early manifestation and great extension of phagocytosis; the vasa recta contained another portion of the cocci. Pfister supposes that the micro-organisms circulating in the blood establish themselves in certain favorite spots, and are not carried there as emboli. The case belongs to an uncommon variety of pyæmia. Nicaise Walther, A. Fränkel, and Fleischhauer give more or less analogous observations.

With regard to the parotitis, Pfister found it a confirmation of the theory maintained by Hanau, that the inflammation is caused by micrococci entering from the mouth through the salivary ducts, and that it is not of metastatic origin. He likewise ascertained that in the healthy gland on the opposite side a collection of cocci and pus-cells already existed in the duct; its larger ramifications gradually diminished in size and finally disappeared.

Saverio Santori, of Rome, ⁵⁰ _{Dec. 10, '96} publishes a preliminary contribution on a severe epidemic of septicæmia, observed in some chicken-coops in Rome, due to what he considers an as yet unknown variety of chromogenic micro-organism in the group of septicæmias attacking domestic animals. This variety from a clinical point of view resembles hen-cholera, but is separated from the latter by its etiology. It is a short, motile, liquefying bacterium, which often can hardly be distinguished from a coccus, and which

at the ordinary temperature gives a bright-red color to all customary culture-media in from twenty-four to forty hours. The degree of virulence of this micro-organism is very high. Water, with which a blood-clot of one of the hens killed by the disease has been washed, kills in ten to eighteen hours hens, rabbits, and guinea-pigs when injected subcutaneously. A post-mortem examination shows nothing abnormal from a macroscopical point of view, either at the place of injection or in the viscera. Microscopical examination, however, reveals everywhere the presence of the micro-organism.

Menereul²⁰²_{July, '96} reports a case of gaseous gangrene due to the septic vibrio, originating in an ulceration of the intestine and situated at the internal aspect of the left thigh of the patient. Death occurred promptly. Pasteur's septic vibrio was discovered to be the cause, positive inoculations having been made.

Bacterium Coli Communis.

Escherich's bacillus coli communis, thought at one time to be innocent and, in fact, useful to the economy, is more and more showing its pathogenic virulence. Gilbert, in a lecture, Jan. 1, '96³ after a summary of the vast pathological domain which this organism seems to occupy, states that it is a vigilant and dangerous enemy, ever ready to take advantage of any weakness that the system may show. When the favorable chance for exercising its baneful influence during life has passed, it seizes upon its prey immediately after death, invades all the organs, and becomes the principal agent of decomposition.

Kanthack²_{July 27, '96} states that the bacterium coli group is as widely distributed as the bacillus fluorescens liquefaciens group. The latter also is found in the intestines, and we have, therefore, no right to assume that fluids or substances containing the bacterium coli, even in abundance, have been contaminated with or from faecal matter. The bacterium coli organisms have been found plentiful in (a) sputum, whether pneumonic, bronchitic, influenzal, tuberculous, or normal; (b) in saliva very frequently; (c) in many diphtheritic membranes; (d) in various suppurating wounds; (e) in all cases of gangrene, cancrum oris, phagedæna; (f) in cases of angina Ludovici; (g) post-mortem in the lungs of almost all individuals; (h) in the secretion from the cervix uteri; (i) often in the urine that had stood for twelve hours; (k) often, also, in cystitic urine; (l) dust was hardly ever free from them, nor (m) sand or earth, or (n) water exposed to the air; (o) frozen mutton was also inhabited by them; and (p) they were found, also, in the snow-crystals of the freezing chambers. It is seen, then, that

these organisms are not merely restricted to fæces, but are ubiquitous, and that, therefore, we cannot fairly conclude that their presence means fæcal contamination.

Henry de Stoeklin ⁹³⁰_{Nov. 1, '94} shares the opinion of some that the denomination of *bacterium coli commune* does not correspond to a single species of intestinal bacteria, but rather to a group of them. There are but two properties which belong to all the members of this group of bacteria,—decoloration by Gram's method and absence of liquefaction of gelatin. An essential difference between various species of the group is that some are endowed with the power of motion and others not; of thirty-five species isolated by de Stoeklin two-fifths could move and three-fifths were motionless; but he thinks that these proportions may vary according to the age and sex of the persons examined. The movements of the bacteria were always very energetic. Staining of the cilia by Loeffler's method affords a good means of distinguishing them not only from intestinal bacilli endowed with motion, but also from Eberth's bacillus.

Fremlin ³²⁴_{Nov. 19, '94} had endeavored to ascertain whether the *bacterium coli* obtained from the excrements of various animal species by means of culture on gelatin plates is the same as that of man. He found no *bacterium coli* in the fæces of rats, pigeons, and guinea-pigs; but, on the other hand, he found it in the fæces of dogs, rabbits, and mice. Fremlin draws the conclusion that the *bacteria coli* are much alike in the various species of animals; the *bacterium coli* of man is more rapid in its movements than the others; the *bacterium coli* of the rabbit moves but little, if at all. If acetic acid or caustic soda be added to the potatoes, the appearance of the human *bacterium coli* is more like that of the typhoid bacillus than is that of the other *bacteria coli*. The human *bacterium coli*, like the bacillus of Eberth, is likewise more sensitive to high temperatures than are the other *bacteria coli*. The cilia are always difficult to perceive in the various *bacteria coli*; they are never to be seen in the rabbit unless the *bacterium* has been made virulent by Alexander Fränkel's method (closure of the intestine), which bestows upon it greater mobility and the fermentative properties of the human *coli bacillus*.

E. Boix, of Paris, ⁹²⁷_{June 8, '96} publishes an article on the temperature-lowering action of the products of culture of *bacterium coli commune*. The toxin obtained from the culture when injected causes convulsions and the death of the animal with lowered temperature. Repeated ingestion gives rise slowly (from eight to forty-four days) to the same effect as does venous injection. Icterus gravis with lowering of the temperature would seem to be

an infection by the bacterium coli commune with hepatic localization. Not long ago it was believed that rapid gaseous gangrene was produced by a specific bacillus,—the bacillus of malignant oedema. Later researches proved that other bacilli—the streptococcus, the staphylococcus, the bacterium coli commune—could produce the same effect. Bunge¹⁶⁴_{Nov. 22, '94} discovered the bacterium coli commune in a case which he observed, and undertook a series of experiments, the results of which he communicated to the Medical Society of Halle. In a first series of experiments Bunge injected pure cultures of bacterium coli commune which he had separated into the peritoneum and under the skin of guinea-pigs. Intraperitoneal injections caused the death of the animals in twenty-four hours. In subcutaneous injections the cultures gave rise to simple non-gaseous phlegmons, and notwithstanding spontaneous or artificial opening of the abscesses formed the animals finally died in a state of marasmus. Bunge compares this form of death in a state of marasmus to that which long ago impressed clinical observers,—namely, that nursing infants suffering gastro-enteritis died in a state of marasmus long after the diarrhoea had stopped. In his opinion, both in the inoculated guinea-pigs and in the suffering infants, there exists a profound poisoning of the system due to the products of virulent bacteria coli.

Bacterium Coli Communis and Bacillus Typhi.

Giovanni Alonzo,⁵⁰⁵_{Nov. 9, '96} in view of the fact that the etiology of typhoid fever cannot be definitely decided, owing to the almost complete identity between Eberth's bacillus and the bacterium coli commune, frequently undertook a series of experiments to determine, if possible, the differential diagnosis between these two organisms.

During the first series of his experiments he tried the method used by Sclaro in the cultivation of bacteria on fresh eggs. During the second series he adopted the following method: A fresh egg was cooked and then, with due precautions to prevent contamination by utensils, was cut into several slices, each containing both white and yellow. The surface of each segment was then inoculated. Basing himself on the differential characteristics shown by the two bacteria, and which will be exposed below, Alonzo thinks that there can be no doubt that certain elements give the right to affirm that Eberth's bacillus and the bacterium coli commune are of different species. The differential characteristics which he noted are as follow: 1. The bacterium coli commune gives rise on fresh eggs to the production of an enormous amount of gas, while the typhoid bacillus gives out none or hardly any. Both

bacteria invade the white and the yellow of the egg in the same way, though the typhoid bacillus does so somewhat more slowly. 2. In a culture on eggs the typhoid bacillus loses its typical shape after from fifteen to twenty days, while the bacterium coli retains its shape much longer. 3. The virulence of the typhoid bacillus cultivated on egg remains constant up to a certain period, while the virulence of the bacterium coli commune seems to be attenuated. 4. The bacterium coli commune causes abscesses at the spot of injection more frequently than the typhoid bacillus. 5. On hard eggs the bacterium coli forms a fine, buff-colored spot on the white, appearing from twelve to twenty hours after inoculation, and on the yellow a blackish spot, which shows itself the next day. These spots gradually invade the entire surface of the egg, while their hue becomes darker. On the contrary, the typhoid bacillus, both on the white and on the yellow, gives rise to a colorless spot, which appears but a day and a half after inoculation. Another distinction is that, unlike the bacterium coli commune, the typhoid bacillus has but little tendency to spread.

L. Mueller ⁹³⁰_{Mar., '06} contends that the much more luxurious and visible growth of the bacterium coli commune on almost all nutrient media serves to distinguish it from Eberth's bacillus. Cultivated on the potato the bacterium coli commune gives out a disagreeable and characteristic odor. Again, the typhoid bacillus cultivated on potato remains colorless or becomes amber-colored only at the end of some weeks, while Escherich's bacillus, cultivated in the same manner, has already a brownish-yellow hue at the end of a few days and becomes darker every day. Cultures of the two bacteria in milk and in gelatin with glucose furnish other constant differentiating characteristics. They also present certain characteristic morphological appearances. The typhoid bacillus is always surrounded by long and flexible cilia, from eight to fourteen in number, while the bacterium coli commune has but four to six short cilia, which are much less undulated. Usually, Eberth's bacillus is more slender and narrower toward its extremities, which are clearly convex, while Escherich's bacterium is more stubby, stouter, as thick toward its ends as in the middle, and ending abruptly.

If all the above signs are missing, culture on slightly-acidulated potato may be used to advantage. Naked-eye examination of such cultures may show nothing characteristic, but a microscopical examination of the surface of the potato will give an easy, rapid, and sure method of distinguishing between the two bacteria. While Eberth's bacillus, colored by Ziehl's method by methylene-blue or gentian-violet, often shows, twenty-four

hours after inoculation, and always in three to six days, an abundant granular deposit at its two extremities (rounded and highly-colored masses of protoplasm at either extremity, while the middle portion is colorless or barely colored), no such appearance is to be seen in Escherich's bacterium, where, however, an irregular formation of lacunæ, without more intense coloration in one place than in another, may be observed. These polar granules are likewise to be seen, though in a smaller number, in cultures of Eberth's bacillus on neutral agar-agar or on slightly acidified agar-agar (lemon).

Cesares Demel and E. Orlandi ⁴⁰⁸_{v.22, '96} found that both organisms caused death of a guinea-pig in six to eight hours; of a rabbit, in one to three days. (The cultures used were fresh, one-third of a cubic centimetre per kilogramme for the bacterium coli, one cubic centimetre for the bacillus typhi.) The degree of receptivity is as follows in decreasing order: Guinea-pig, rabbit, dog, horse. As to virulence, the bacterium coli is both more powerful and more lasting. The lesions differ only in degree. Immunity may be brought about by filtered and boiled culture-bouillons and by glycerin extract of dead bacteria. Immunity is reciprocal, one of the bacteria immunizing against the other. Demel and Orlandi prepared serums from immunized animals and ascertained, with guinea-pigs and rabbits, that the serum of animals which have become refractory toward the one possesses therapeutic and preventive properties against the other; the cultures of the bacterium coli have a superior effect. The place of injection is immaterial, and the injection should be repeated. Trials have been made on man. Injections of serum taken from rabbits immunized against the bacterium coli are followed, in patients suffering from typhoid fever, by a fall of temperature from one to two degrees and by a decided amelioration in the general state. These effects, however, are transitory.

E. O. Jordan ⁶¹_{Dec. 22, '94} states that there exists a well-nigh complete chain of varieties between the typical colon bacillus and the typical typhoid bacillus. Whether this represents ontogenetic as well as phylogenetic possibilities is still an open question. The intermediate varieties, of which there appear to be many, resemble the typhoid organism very closely. It is still uncertain whether they are able to cause typhoid fever, or a disease resembling it, in man. The cases of alleged conversion of one "species" or "variety" into another do not carry conviction and are susceptible of other interpretations than those advanced regarding them.

Terni ¹²⁶_{July 16, '96} insists upon the diagnostic value of the characteristic vigorous mobility of Eberth's bacillus. None of the species

which are nearly allied to it (*bacterium coli commune*, sundry water bacilli) show such quick and decided movements.

Lösener¹_{Aug. 24, '95} gives a very complete review of the subject, and concludes that the usual points of difference seem fallacious guides. In spite of Dubief's opposite view, it is generally believed that a milk-coagulating bacillus cannot be typhoid. The puncture-culture method—using a 2-per-cent. grape-sugar agar, as employed by Kruse, and also Germano and Maurea—is considered by Lösener to be preferable to the fermentation-tube as used by Theodore Smith for testing a given species. If gas-bubbles are produced in and split the glucose-agar kept at 37° C. (98.6° F.) for twenty-four hours, even if no growth, or hardly any, is visible on the surface in that time, the culture is not one of typhoid bacilli. Indol is not produced by typhoid bacilli growing in albuminous media. The characteristic surface growth on gelatin is of value as a distinguishing point. The bacilli, although very variable in form, are very mobile and have numerous cilia on every side. No single one of all these criteria amounts to much by itself, although all taken together aid us considerably in establishing a differential diagnosis.

B. Lyonnet, of Lyons,²_{Nov. 2, '94} uses the following method for the separation and diagnosis of the typhoid bacillus: Ordinary bouillon is decolorized with animal charcoal, and 1 per cent. of carbolic acid and 20 per cent. of lactose added, plus a small amount of Congo red. The presence of carbolic acid allows the growth of the typhoid bacillus and of the *bacterium coli* only. If the typhoid bacillus only be present the lactose does not ferment; the bouillon becomes turbid, but remains red. If the *bacterium coli* be present the bouillon becomes turbid and the lactose ferments, giving rise to lactic acid, which changes the bouillon from red to violet.

The following conclusions may, therefore, be drawn: If the bouillon does not become turbid, neither the typhoid bacillus nor the *bacterium* are present. If the bouillon become turbid, but remain red, the typhoid bacillus is, in all probability, present. Finally, if the bouillon become turbid, but also become violet, there is reason to believe that the *bacterium coli* is present.

F. Inghilleri³_{Dec. 26, '95} calls attention to the use of nutrient media containing amygdalin as a new method of distinguishing between Eberth's bacillus and the *bacterium coli commune*. The latter, when cultivated in bouillon to which amygdalin has been added, gives an acid reaction and, after thirty-six hours, gives off an odor of essence of bitter almonds; under the same circumstances the typhoid bacillus gives an alkaline reaction. The difference is due to the fact that, like emulsin, the *bacterium coli* decomposes gly-

cosin into grape-sugar, prussic acid, and benzoic aldehyde, and that the grape-sugar is converted into carbonic acid and lactic acid. From the stand-point of toxicology, this reaction is most interesting, as it furnishes an explanation for cases of poisoning by amygdalin; these are due to the fact that the bacterium coli produces prussic acid from amygdalin.

Nicolle,³_{Jan. 23, '96} was unable in any case to demonstrate the presence of Eberth's bacillus in a great number of samples of drinking-water which he had to examine at Constantinople, and which should have contained it, as they appeared to be the cause of certain epidemics of typhoid fever. On the other hand, these infected samples of water contained various subvarieties of bacterium coli commune. In addition, in a case of typhoid fever ending suddenly by intestinal perforation, where the diagnosis was made at the post-mortem examination, the pus found in the intestinal cavity contained only the bacterium coli commune, to the exclusion of the typhoid bacillus; the same was found to be the case with various viscera, the spleen, blood of the heart, etc. The author lays stress upon the fact that, when the bacterium coli commune is present, no existing method enables one to separate Eberth's bacillus, the verification of whose presence is often so important.

Agri,⁷²⁷_{r. 3, '96} has been led to think, from experiments which he has made upon guinea-pigs, that it is possible that in many cases of typhoid fever the bacterium coli commune plays a part in the evolution of the disease.

Uffelmann,¹⁵⁸_{B. 16, H. 1, 3} states that pure cultures of the typhoid bacillus, mixed with fæces dried and kept under observation for a long time, stand the drying-test much better than the cholera bacillus. In dried earth, in white sand, and on pieces of clothing the bacillus lives as long as two months. The dust from these dried substances infects gelatin and milk, from which pure cultures may be obtained. This also shows that the typhoid bacillus may be transmitted through the air.

To ascertain the presence of bacteria of the typhoid group in water Wasburzki,⁵⁰_{Nov. 9, '96; B. 16, No. 16, 17, p. 526} uses three small, sterile, Erlenmeyer flasks, in each of which 45 cubic centimetres of the water to be examined and 5 cubic centimetres of a 10-per-cent. peptone-salt-glucose solution are mixed. The first flask receives no addition; the second receives 0.5 cubic centimetre; and the third, 1.0 cubic centimetre of a mixture of phenol, 5.0; hydrochloric acid, 4.0, and distilled water 100. As soon as the growth of the contained bacteria causes the liquid in each to cloud a little, gelatin plates are made from each. As soon as the colonies are large enough, those corresponding most nearly to typhoid are transferred to glucose, agar-

agar, and to bouillon. The cultures are kept at the temperature of the body. The formation of gas in the sugar agar-agar excludes the typhoid bacillus.

Marpmann⁵⁰_{Nov. 10, '94} uses the following diagnostic method: He adds decolorized pigments to the usual nutrient media. With agar and gelatin is mixed, in the proportion of 2 per cent., a 1-per-cent. solution of fuchsin, decolorized by concentrated solution of sodium bisulphite. After the addition of aldehyde the red color re-appears. In the place of fuchsin, malachite-green was found more advantageous. In this mixture (after adding aldehyde) the cholera vibrio, the vibrio of Metchnikoff, bacillus liquefaciens, typhi murium, and typhi abdominalis become green, while spirillum rubrum, some micrococci, yeast-forms, and bacillus coli communis remain colorless.

Miscellaneous Intestinal Microbes.

Issaeff and Ivanoff²⁸⁰_{v. 4, No. 21, '96} state that Ivanoff's vibrio, discovered in a case of typhoid fever, may be distinguished under the microscope from Koch's comma bacillus by its tendency to form rather slender and elongated spiral filaments. Furthermore, its cultures are not phosphorescent; given in the dose of one-eighth of a platina loop of a twenty hours' culture on agar-agar, it causes the death of guinea-pigs when injected in the peritoneum, but not when administered by the digestive system. Animals can easily be immunized in various ways against Ivanoff's vibrio. The height of immunity is attained after the eighth or tenth injection. Their blood possesses extremely marked bacteria-destroying properties, which is different from what is found in animals immunized against cholera. Guinea-pigs immunized against the vibrio do not resist its toxin any better than non-immunized animals. The smallest dose of serum capable of giving immunity is 0.05 milligramme in the peritoneum and 0.01 milligramme under the skin. The serum which gives immunity against Ivanoff's vibrio likewise protects animals against cholera.

Charles de Klecki, of Krakow,²⁸²_{Sept., '96} publishes a note on a new intestinal microbe. While studying this class of organisms he was struck by the extraordinary shape of the colonies on gelatin plates of a certain species which he had obtained from the small intestine of the guinea-pig. It was a saprophytic bacillus with rounded extremities, 2μ long by 0.75μ wide in fresh cultures, longer in old cultures. It was motile, often grouped, but rarely forming short chains. It remained stained by Gram's method, but did not liquefy gelatin. A streak culture on agar-agar kept at 33° C (91.67° F.) gave in twenty-four hours a rather thick,

grayish-yellow culture; on each side of the inoculation streak fine branched prolongations were formed.

The colonies, somewhat resembling the outline of a star-fish, are not very often met with. De Klecki calls it the *asteriform* microbe.

Charrin, of Paris, ¹⁴_{July 17, '96} states that, for some years, he had observed that the deposit of pyocyanic toxins in the digestive tube, whether with or without alkalization, gives rise to only insignificant phenomena. Usually, even vaccination cannot be brought about, unless large doses are used. On the other hand, if the smallest quantity of these same toxins are introduced into the blood, an intense enteritis, with more or less numerous hæmorrhages from the walls, is produced. He has several times repeated his observations; several other writers have verified them in various diseases,—in cholera, diptheria, and pneumococcic infection; he has personally noted it in tetanus and infection by the bacterium coli. These facts show that the modes of entrance have considerable influence upon the toxicity, as they also have upon the virulence. They likewise show that we are protected against these toxins, and prove, too, that in cases of diarrhœa or of enteritis it cannot be affirmed with certainty that the seat of the affection was primarily in the intestine.

Beco ²⁶²_{Mar. '96} finds that, in the majority of cases, microbes characteristic of the intestine, including especially the bacillus coli, are to be found in the spleen or thyroid, or both, immediately before death in many diseases, including some in which the intestine was not diseased. In diarrhœa produced artificially in rabbits, such generalization was observed only in the less acute cases. He argues that the microbes must have been carried to the spleen and thyroid by the blood, and thinks the bacillus coli multiplies rapidly in them after death. He contends that much caution must be exercised in deducing from the presence of the bacillus coli in the internal organs after death in intestinal diseases that their existence there has any pathological significance.

Dallemagne ⁹⁸⁶_{Feb. 25, '96} states that, in the gastro-intestinal tract of dead subjects, the flora show a certain homogeneousness in the various cavities. The number of species of bacteria is limited; in the great majority of cases they are the same. The various species found are, to a certain degree, in connection with the cause of death. After death the flora of the intestine have a tendency toward unification.

Achard and Phulpin ⁹²⁷_{Oct. 17, '94} have studied the penetration of micro-organisms into the body during the death-agony and after it. The resistance to infectious germs apparently does not cease

suddenly at the moment that the heart stops beating, but continues during the first moments succeeding death.

Gonococcus.

Henry Heiman, of New York, ⁵⁹_{June 22, '90} contributed a very valuable paper on this subject. After a careful study of the male urethra and the vulvo-vaginal tract of children, he reached the conclusion that (1) the gonococcus (Neisser) is never present in the normal urethra. 2. The diplococci found in the normal urethra can be positively differentiated by the Gram stain. 3. That the diplococcus described by Turro in connection with his acid-media experiments is not the gonococcus. 4. He indorses Wertheim's conclusions, except that he believes the liquid sterilized chest-serum is a better culture-medium in every way than placenta serum. 5. That urine-agar is not an ideal culture-medium, as Finger claims. 6. Gram's stain is the only crucial staining test for the presence of the gonococcus (Neisser), and should therefore be employed in all cases. 7. For ordinary staining of the gonococcus he recommends a 2-per-cent. alcoholic methyl-violet solution. 8. Certain reports of the discovery of the gonococcus in various parts of the body, such as mouth, rectum, and serous cavities, must be looked upon with skepticism, owing to the fact that Gram's stain and culture-media were not applied. 9. The normal vulvo-vaginal tract is never a habitat for the gonococcus, as far as demonstrated. 10. Gram's stain is here also the differential stain between the diplococci found in pus-cells from the diseased vulvo-vaginal tract. 11. There is reason to believe that there is a specific micro-organism in catarrhal colpitis, either the diplococcus of Bockhart or of E. Fränkel. 12. In specific colpitis the gonococcus found is identical with the one found in specific male urethritis. 13. The experiments on the human urethra confirm the belief in the specific pathogenic power of the gonococcus (Neisser).

Finger, Ghon, and Schlaggenhaufed ²⁶⁶_{Oct. '91} publish an article on the biology of the gonococcus and the pathological anatomy of the gonorrhœal process. It is known how difficult it is to obtain a pure culture of the gonococcus and how many attempts to do so have been made, with a result which, until now, has not been very favorable. The writers recommend Wertheim's method, but somewhat modified. In their researches they substituted Pietri's tubes for plate cultures. As they noted that urea and peptones were favorable to the growth of the gonococcus, they came to the conclusion that the best culture-media were agar-agar to which human urine had been added, and next in order agar-

agar to which human serum had been added. With reference to its biology the gonococcus is affected by an alkaline medium, but very little affected by the latter's acidity. The most favorable temperature for its vitality is 36° C. (96.8° F.). The colonies are very few in number at 39° C. (102.2° F.), and die in twenty-four hours. It has been thought that certain practical conclusions could be drawn from this fact, but the authors obtained no result after having passed water at a temperature of from 45° to 48° for twenty to thirty minutes every day through a gonorrhœal urethra by means of a metallic sound with double current. The gonococcus lives but a short time on culture-media, and it is consequently necessary to re-inoculate it every two or three days. Its vitality does not last longer on natural media; the gonococci in dry pus are dead,—a fact which is important in hygiene and legal medicine. Clothing and linen are consequently virulent only as long as they have not dried. Dilution in water at any temperature destroys the virulence of gonococci in five hours at the most. *In vitro* neither potassium permanganate, carbolic acid and silver nitrate at 1 to 1000, nor corrosive sublimate at 1 to 5000 destroys the gonococcus. Experiments prove that gonorrhœa does not confer a temporary local immunity, as has sometimes been said. A chronic condition does not prevent re-infection. In the articulations inoculation produced an acute arthritis without any infiltration of the serous membrane by the gonococci; commonly, indeed, they perish in the exudation in from twenty-four to forty-eight hours. Inoculations in the peritoneum gave no results. Of fourteen inoculations made into the male urethra, three only succeeded; they failed in patients whose temperature rose to at least 39° C. (102.2° F.).

B. E. Vaughn and H. T. Brooks ²⁴⁵_{Jan., '96} state that the development of the gonococcus is restricted and the virulence destroyed by the use of an alkaline culture-medium. The temperature best suited to the growth is 36° C. (96.8° F.). It will not grow below 25° C. (77° F.) nor above 40° C. (104° F.) and the cultures retain their vitality from four to six weeks if prevented from drying, while gonorrhœal pus has been kept moist and found virulent after seventy-one days. It is not very susceptible to chemical germicides. In some instances observers have inoculated with pure cultures patients about to die, and in the recorded cases this attempt was unsuccessful when high fever was present; otherwise gonorrhœal urethritis developed.

In Finger's report of the only recorded autopsy on a case of acute gonorrhœa (produced in this way) the flat epithelium of the fossa navicularis was covered by pus-corpuscles, and these were also in the interstices between the cells, but the cells themselves

were practically undisturbed. Elsewhere the cylindrical epithelium was displaced and the deeper transitional cells were infiltrated by pus-cells. Wherever a follicle caused a break in the epithelium the inflammation was more intense and extended deeper, and the intensity of inflammation was directly proportional to the nearness to a follicle. The sinuses of Morgagni and the ducts of Littre's glands were found plugged by masses of pus-corpuscles. The gonococci were found on the surface only of the squamous epithelium, but penetrated pus-corpuscles and also the cylindrical epithelial cells and the connective tissue. All cases applying for treatment for urethritis were microscopically examined as follows: Pus was collected on a glass slide directly from the meatus; a second slide was drawn over the first to uniformly distribute the matter, and both were dried. The following solution—concentrated alcoholic solution of methylene-blue, 30 cubic centimetres; solution of potassium hydrate, 1 to 1000, 100 cubic centimetres—was now applied by a pipette and then washed off in water, and the specimen dried over a flame. Examination was made with a one-twelfth oil immersion lens without cover-glass. The appearance coincides with the description of Finger: a diplococcus each half of which resembles a coffee-bean, having a straight and curved border, the two halves lying so that the straight edges almost coincide, a small slit only intervening. These differ from other diplococci in being found in groups, never in chains, the number of individuals in each group being divisible usually by four.

Bordoni-Uffreduzzi ⁴⁰⁹_{v.22, No.1, 1906} published experiments which appear to furnish evidence that the gonococcus is able to diffuse itself in the internal parts of the organism, and to give rise to inflammatory conditions. Among other experiments of the author the following conclusive one was performed: The urethra of a healthy young man who had never suffered from gonorrhœa, and who had not had sexual connection for four months, was inoculated with a small quantity of material taken from the second generation of a cultivation of the micro-organism. (The inoculation was performed with the man's consent.) The parts were examined for the gonococcus before the inoculation, but only the ordinary bacilli of the smegma were found. The glans penis and meatus were then washed in sterilized water, and the micro-organisms deposited in the urethra, a little beyond the meatus. A typical attack of gonorrhœa was the result, and gonococci were found in the discharge.

J. H. Wright ⁵_{Pub. 1906} succeeded in cultivating a diplococcus, which was, with little doubt, the gonococcus, from 7 cases of acute gon-

orrhœal urethritis, from 8 cases of purulent ophthalmia (of whom 4 were infants), and from 4 out of 20 cases of pyosalpinx. It was also found in a case of vaginitis in a child aged 9 years. The only uncertainty about the identification of the diplococcus was that inoculations were not made into the human urethra.

R. Turro, ⁵⁰_{B. 17, Nov. 24, 25, '96} while experimenting with the culture of the gonococcus in bouillon or gelatin, rendered acid by means of 1 per cent. of Catillon's peptone, noted that the streptococcus grew very well on that preparation. A series of experiments have induced him to prefer a medium composed of from 15 to 20 cubic centimetres of bouillon or gelatin, to which are added 1 or 2 drops of hydrochloric acid. The streptococcus grows rather slowly in this medium, which is unfavorable to the growth of other bacteria, but retains its vitality much longer and acquires a much greater virulence than when grown in neutral or alkaline media.

H. D. Chadwick, of Boston, ⁹⁰_{Oct. 3, 10, '96} states that, in order to make a certain diagnosis of the presence of Neisser's gonococcus, it must be found in considerable numbers, and these arranged in groups within the leucocytes. They must also decolorize very readily by Gram's method of staining. In cases where but few scattering diplococci are found, and most of those outside the cells with other bacteria, a diagnosis of gonorrhœa is not justifiable; particularly is this the case in the vulvo-vaginites of children. The best methods of staining the gonococcus are the following: 1. Place cover-glass after fixing in Loeffler's methylene-blue, five minutes. 2. Wash in dilute acetic acid (one drop to watch-glass) one to three seconds. 3. Wash, dry, and mount. The nuclei are found stained blue, but the protoplasm and cell-outline are hardly visible, often making it impossible to say whether the diplococci are within the cell or not.

Neisser's method: 1. Stain cover-glass with saturated alcoholic solution of eosine, thirty to forty-five seconds. 2. Drain off excess with filter-paper. 3. Stain the unwashed cover-glass with saturated aqueous solution of methylene-blue. 4. Drain off excess with filter-paper. 5. Wash, dry, and mount. The result shows outline of cells distinctly, with their protoplasm stained pink, the nuclei blue, and the bacteria a darker blue. Gram's reaction should be always used to make diagnosis doubly sure.

Gram's method: 1. Aniline-water, gentian-violet, three to five minutes. 2. Iodide-iodine solution, one to two minutes (iodine, 1 gramme; potassium iodide, 2 grammes; water, 300 cubic centimetres, mixed). 3. Rinse off stain in alcohol. 4. Dry and mount. The gonococcus, when treated by this method, is decolorized almost instantly when rinsed off in 95-per-cent. alcohol,

five to ten seconds at the most being the time necessary for complete decolorization.

Steinschneider and Schäffer⁴_{No. 45, '96} contribute the following practical points: 1. For growth of gonococci, blood-serum or serous fluid from man affords the best soil; next to this must be ranked the serum or serous fluid from cattle, sheep, dogs, and rabbits. 2. Urine-agar as a culture-medium has not proved reliable. 3. Wertheim's plate method is better carried out by means of a sterile brush. 4. A temperature of 40° C. (104° F.) for twelve or more hours not only stops the growth of gonococci, but kills them. 5. Room temperature checks the growth of gonococci, but does not kill unless the exposure is prolonged. 6. In water or urine mixed with gonorrhœal pus, gonococci may retain the ability to grow one to two hours, and, under some circumstances, even longer. 7. The introduction of gonococci into the subcutaneous connective tissue causes no pus-formation.

Cholera Bacilli.

Ransom⁶⁹_{No. 26, '96}; ⁶_{July 27, '96} published a remarkable communication on the cholera virus and its antitoxin. He states that injections of bouillon cultures of cholera bacilli have a typical influence on the temperature of guinea-pigs. A quantity of cholera bacilli sufficient to kill the animal within twelve hours makes the temperature first rise for about three hours and then fall till death. If the quantity of bacilli is not large enough to be fatal the temperature, after having fallen for some hours, suddenly rises again. In the most severe cases, where the animal dies within two, four, or six hours, the temperature falls immediately from the moment of the injection till death. From these facts Ransom concludes that a large amount of dissolved virus must be contained in the culture-fluid. He even succeeded in finding the virus in a culture-fluid from which he had previously removed the bacilli themselves; injections of this fluid killed guinea-pigs much more quickly than when the bacilli were still in it. It was thereby proven that the virus was really present in a state of solution in the bouillon culture. Injections of the dissolved virus produce the same symptoms as injections containing bacilli; the animal grows faint, its fur becomes rough, its eyes lose their natural brightness, the skin becomes cold, general trembling ensues, and very soon the temperature falls. From the fluid Ransom also obtained a solid substance which produced the same pathological symptoms as the diluted virus. This substance is of extreme virulence; 0.07 of a cubic centimetre kills a guinea-pig within twelve hours, and 0.1 even in fifteen minutes, but when given by the

stomach it is innocuous. Ransom then immunized guinea-pigs, goats, and wethers by the well-known methods of Behring. He states that there is an antitoxic substance in the blood of immunized goats. He made a 4-per-cent. solution of the solid virus with the serum of immunized goats, injected this into guinea-pigs, and found that the animals survived even if 0.25 gramme of the solid virus were injected. The antitoxin is efficacious against both the fluid virus and the cultures of cholera bacilli. The blood of goats which have not been rendered immune has no effect at all. If simultaneous injections are made of virulent bacilli into the peritoneal cavity and antitoxin under the skin the animals will survive; the same is the case when the serum is previously injected.

Wesbrook and J. Lucas Walker²⁶²_{May, '96} state that products obtained from the culture of the vibrio on various mediums are not of the same chemical constitution, so far as they could judge by the usual means; there is, however, a certain uniformity in their physiological effect. Thus, from cultures on alkali-albumin there may be obtained a deuteroalbumose, traces of protoalbumose, variable quantities of a proteid substance (probably alkali-albumin); from cultures on eggs, a mixture of proteid substances impossible to separate; from peritoneal exudations, a product which, although giving a slight xanthoproteic reaction, appears to contain neither deuteroalbumose nor protoalbumose; from cultures on asparaginate of sodium, a product which gives a slight xanthoproteic reaction, but not the biuret reaction. These products seem to differ as to their chemical nature, but are similar as regards their physiological action. They all produce mortal effects or, in small doses, produce a decided immunity toward living cultures.

E. Wernicke²⁶⁰_{Mar. 1, '96} was able to separate from a sample of Elbe water taken at Wittemberg, where cholera was then reigning, two forms of vibrio resembling, at first sight, Koch's vibrio. The No. 1 Elbe vibrio may, however, be distinguished by the following characteristics: When stained its size is almost twice as great; the cholera-red reaction is four times less marked; on gelatin plates its colonies have a different shape; its virulence in guinea-pigs is very slight. The No. 2 Elbe vibrio is much smaller than Koch's bacillus; its red reaction is strong; its colonies on gelatin are not disposed in the same manner, and it shows great virulence in rabbits, pigeons, guinea-pigs, gray and white mice. Finally, Wernicke discovered, in the water of the Havel, a third vibrio possessing no red reaction, showing a disposition to give forms of involution on different nutrient media, and without effect upon either guinea-pigs, pigeons, rabbits, or mice.

A. Zawadzki and G. Brunner¹¹⁰¹_{7.3.p.461, '96} report three new varieties of vibrio, discovered in well-water at Lubline and Warsaw. They are exceedingly motile, and their chief characteristics are that they do not liquefy gelatin, do not give the indol reaction of Bujwid, but give Legal-Weyl's reaction, and that they remain stained by Gram's method.

Toward the end of August, 1893, Pfuhl⁵⁸_{2.17, '94} discovered, in the water of the north port of Berlin, in a place where two cases of cholera had occurred in a boat, a vibrio giving the indol reaction, but differing from Koch's comma bacillus by certain particularities, both as to culture and to pathogenic properties. On gelatin plates its colonies were exactly like those of Metchnikoff's vibrio, and in animals it gave rise to exactly identical symptoms and lesions. Pfuhl concludes that the vibrio found by him is the same as the one found at Odessa by Gamaleia in the gastro-enteritis of birds, to which Metchnikoff's name had been given, and which, until now, had not been discovered elsewhere; it may, consequently, be found in water like other pathogenic comma bacilli, and, accordingly, must be thought of when a diagnosis of cholera is to be made.

B. Gosio⁹⁹⁰_{Feb. 16, '96} examined five varieties of vibrios found in water and three varieties of cholera vibrios taken from patients; he inoculated with them solutions of peptone to which glucose had been added and left the cultures from two to four weeks at a temperature ranging from 30° to 38° C. (86° to 100.4° F.). The greater amount of sugar was decomposed by the Elbe No. 2 vibrio of Wernicke (80.04 grammes out of 150 grammes giving rise to 9.25 grammes of free lactic acid); on the other hand, the vibrio discovered by Wernicke in the Havel decomposed the smallest amount of sugar (28.14 grammes giving rise to only 1.28 grammes of free lactic acid). As a rule, the production of lactic acid varies with the amount of sugar decomposed. Virulent forms give, as a rule, the greatest amount of lactic acid; it is always a sinistroyre acid. There is always a production of alcohol, though often there are but traces of it. Gosio thinks that such results authorize him to admit the existence of a close relationship, if, indeed, not identity, between the vibrios which he examined (Dunbar's vibrio of the Danube, three vibrios of Wernicke) and the vibrio discovered by Koch in cholera Asiatica. Gosio also states that, at the end of thirty-seven days, Koch's cholera vibrio had produced 15.42 grammes of zinc lactate for 63.6 grammes of sugar decomposed (0.24 to 1). During the four weeks of experimenting lactic acid was constantly produced abundantly during the first two weeks and in very small amounts during the last two weeks.

The decomposition of the sugar and the formation of acid were exactly parallel. From the first week acetic and butyric acids were formed and increased slowly in amount; at the end of thirty-nine days the proportion of these volatile acids, reckoned in H_2SO_4 , amounted to 1.52 grammes for 63.6 grammes of sugar decomposed. Consequently, parallelism also exists between the decomposition of sugar and the formation of volatile acids. The most favorable temperature for the formation of acids was that of the incubator. The sweeter the nutrient liquid is, the more sugar is decomposed and the more acids formed, while the opposite is noted according as the nutrient liquid is more or less rich in peptones. Cultures of sweetened peptone also produce alcohol; the maximum after twenty-one days in 250 centimetres, which were distilled, amounted to 3.075 grammes; evaporation had naturally carried off the remainder. The vibrio of cholera also forms aldehyde and acetone and barely a trace of carbonic acid. Of the sugars grape-sugar is the most energetically decomposed by Koch's vibrio and gives the greatest amount of lactic acid; the remainder may be classed as follows, from above downward: Cane-sugar, maltose, and finally lactose, which is but little affected and which gives no sign of lactic acid. The lactic acid formed is always sinistroyre. The production of indol increases with the diminution in the amount of cane-sugar destroyed; when this latter is abundantly decomposed, indol is completely wanting. In sweetened nutrient solutions which are free from albumin (asparagic acid) the energy of the decomposition and the relative proportions of sugar decomposed, on the one hand, and the relative proportions of lactic acid and volatile acids found, on the other, are sensibly the same as when the nutrient liquid contains peptone; the acid obtained is also sinistroyre. The vibrios of Koch, Dunbar, Metchnikoff, of Elbe No. 1, of Massowah, and of Finkler and Prior possess about the same power of decomposing sugar.

D. Hellin⁸⁸⁰_{Apr. 1, '96} states that the comma bacillus produces alkalies only when oxygen is allowed free access to it; in anaërobic cultures it produces acids. The formation of alkalies corresponds to oxidation, that of acids to reduction. In the intestine, consequently, the bacilli of cholera must give rise to acids and act as reducing agents. In accordance with what Emmerich has said, the comma bacillus produces nitrous acid in its cultures, especially in fresh ones.

W. Hesse⁸⁸⁰_{v. 2, No. 7, '96} doses the gaseous products of the growth of bacteria in order to appreciate the properties of the cultures made of them. He calls especial attention to the influence exerted by

the alkalinity of the nutrient medium upon the cholera bacillus: the cultures of the comma bacillus are favored in proportion as the setting free of carbonic acid and the absorption of oxygen are more considerable. The maximum of gaseous exchanges corresponds to the most favorable alkalinity, which latter is realized by adding $\frac{1}{10}$ or $\frac{2}{10}$ cubic centimetre of normal caustic-soda solution to each 25 cubic centimetres of nutrient agar. Koch's comma bacillus does not grow, but soon perishes, on slightly-acid agar; while it grows, though feebly, on a medium composed of 25 cubic centimetres of agar-agar and 3 cubic centimetres of normal caustic-soda solution; consequently, it possesses great powers of resistance against alkalies.

H. Leo and R. Sonderrmann,⁵⁸_{v.16, '96} have studied the influence of bile, urea, and borax on the bacilli of cholera. On gelatin plates, to which as much as 50 per cent. of ox-bile was added, growth was clearly rendered more active and the colonies were larger. When the nutrient media contains from 75 to 80 per cent. of bile, or when the bacilli are placed in pure bile, they cease growing, but are not killed. This result, which is opposed to that of Leubuscher,¹¹⁴_{v.17} who found that the comma bacillus was perfectly well developed in non-diluted bile, is due to the fact that this latter observer introduced numerous bacilli into a small amount of bile (1 cubic centimetre), while Leo and Sonderrmann, on the contrary, inoculated ten times as much bile with a small quantity of bacilli. Urea stops the growth of the bacilli at the low dose of 1.45 per cent.; at 5 or 10 per cent. they are killed. Borax also arrests the growth of Koch's comma bacillus at the dose of 1 to 1000 and kills it from 0.5 per cent. onward. Leo and Sonderrmann therefore recommend it as a prophylactic.

E. Weibel,⁹³⁰_{Jan. 1, '96} has been led by his experiments to think that Metchnikoff's and Koch's vibrios must no longer be looked upon as belonging to two distinct species; in opposition to what R. Pfeiffer had noted, six pigeons out of seven have, after vaccination by the comma bacillus, become refractory to Metchnikoff's vibrio.

Theodore Rumpel,⁴_{No. 4, Jan. 29, '96} publishes an article directed against certain conclusions of R. Pfeiffer. The latter had indicated the three following means of distinguishing from Koch's comma bacillus the bacilli which resemble it: 1. Vibrios which resemble Koch's vibrio are exceedingly virulent for pigeons; the latter are almost completely refractory toward the bacillus of cholera. 2. It is not possible to confer immunity by means of the cholera vibrio as regards choleriform vibrios. 3. Choleriform vibrios are phosphorescent, while Koch's vibrio is not phosphorescent. Rumpel's experiments have proved to him that under certain conditions

the comma bacillus is virulent for pigeons, that immunity conferred upon an animal by a comma bacillus of certain origin does not always protect it against infection by a comma bacillus of another origin, and that, finally, phosphorescence may be observed with the true comma bacillus.

R. Pfeiffer ⁴ endeavors to refute Rumpel's criticisms. In the first place, he never maintained that pigeons were completely refractory to the comma bacillus, as Hueppe, Salus, and Rumpel seemed to say he did; he has even given an account of experiments proving the contrary; however, he still insists upon it that the comma bacillus is not infectious for pigeons, as it attacks them only as does the harmless hay bacillus. Pfeiffer has likewise never claimed that all the choleraform species of bacilli were possessed of the decided infectious property which he found in Metchnikoff's vibrio.

Having had in his possession authentic cultures of the same comma bacillus as Rumpel, he claims that they are not phosphorescent, and that they do confer immunity with respect to one another. Pfeiffer, too, has never said that all choleraform species of bacilli were phosphorescent. As to the phosphorescent cultures of cholera made by Rumpel, Pfeiffer, having examined them, found them to be totally unlike authentic cultures of the same cases, but received from other sources; he looks upon them as cultures of the Elbe vibrio.

A. W. Grigoriew ⁸⁸⁰ made cultures of the vibrios of Metchnikoff, of Finkler and Prior, of Deneke, and the water vibrio of Günther, in eggs. The injection, into the abdominal cavities of guinea-pigs, of albumen ($\frac{1}{2}$ to 5 cubic centimetres) from the infected eggs gave rise to no very intense toxic phenomena except in the case of cultures of the vibrio of cholera and of the vibrio of Metchnikoff. The vibrio of Finkler and Prior was the least toxic. The toxic power of Koch's and Metchnikoff's vibrios cultivated in eggs was greater than the toxic power of the same species cultivated in other media; 5 cubic centimetres of albumen caused the death of animals in five to eight hours; $\frac{1}{2}$ to 1 cubic centimetre in twenty-five to thirty hours. The lesions were found on examination to be much more profound than those following inoculation from cultures made on agar-agar. Vibrios were found to be more numerous in the abdominal viscera, in the peritoneal exudation, and in the contents of the intestine proportionately to the late on-coming of death. The aqueous extracts of alcoholic precipitates of the albumin of the vibrios of Koch and Metchnikoff alone showed toxic qualities (especially the second), and toxins were obtained from them. Grigoriew concludes that the vibrios

of Metchnikoff, Koch, and Finkler and Prior produce substances having about the same action, while the vibrio of Deneke and the water vibrio of Günther produce but very little toxic substance. By successive inoculation of eggs, first with bacterium coli commune and two or three weeks later with the comma bacillus, he obtained the same results as by inoculating the eggs solely with the comma bacillus.

W. Kempner ⁸⁸⁰_{Apr. 1, '96} agrees with Hueppe, Scholl, and others, and is opposed to R. Pfeiffer in recognizing that eggs infected by the cholera bacillus produce sulphuretted hydrogen; notwithstanding the continuous diffusion of this gas through the shell, some is still to be found inside the egg at the end of the cultures. It must be added too that eggs afford an exceedingly good medium for the cultivation of the cholera bacillus, the latter remaining virulent for a month or two.

R. Abel and A. Draer ⁵⁸_{v. 19, No. 1, '96} have experimented with hen's eggs as a culture-medium for the cholera vibrio. The numerous experiments made by them (fifty-two inoculations with twelve kinds of vibrios of various origins) showed them that, in opposition to what is generally admitted, hen's eggs are an exceedingly poor culture-medium for the comma bacillus. In a considerable number of cases there are found, together with the vibrios, other bacteria which had, perhaps, penetrated into the egg through the shell after its inoculation or may have already been present before inoculation. They likewise discovered that pure cultures of cholera may be found in the yellow of the egg which has retained its natural color, as well as in that which has been changed into a greenish, viscid mass. In both cases the egg may at the same time contain other bacteria, whose presence can be revealed only by the microscope or cultures. The color of the yellow is dependent upon the amount of culture inoculated, the variety of vibrio, and the natural and varying color of the yellow in each egg. As to formation of H_2S , they found that it was by no means a constant phenomenon in eggs inoculated with the vibrio of cholera.

Dönitz ⁵⁸_{June, '96; July 27, '96} also records the results of experiments with the cholera spirillum in egg-medium. Hueppe recommended this medium, thinking that, grown thus, the spirillum generated H_2S , and was anaërobic, and that the conditions of growth were thus more like those in the human intestine. It is shown, however, by one series of experiments that in fresh eggs, sterilized superficially with hyd. perchlor., inoculation of cholera spirillum with due precautions produces a culture either pure or with admixture of foreign organisms, in the former case without, in the latter case with, formation of H_2S . Occasionally the foreign organisms cannot be

demonstrated when H_2S is formed, probably owing to the small number present or to cloudiness of the microscopical preparations in these cases. In a further series of eggs in which the outer layer of white is sterilized to a certain depth by exposure to boiling water or to formalin, it is shown that by this means the formation of H_2S and also the presence of foreign organisms is diminished. This accords with the discovery of Abel and Draer that micro-organisms penetrate eggs if these are allowed to become dirty and especially if exposed to damp; and also disproves Hammerl's view that some cholera spirilla formed abundant H_2S , while others formed little or none, for spirilla from the same source as his were used in these experiments. Dönitz also concludes that cholera spirillum in egg-medium does not form H_2S recognizable by ordinary methods, and, further, that egg is a most unsuitable medium for pure culture of bacteria, as it is impossible to know beforehand whether the egg is sterile.

Tubercle Bacillus.

Bruns⁵⁰
June 22, '96 studied the question of pleomorphism in the bacillus tuberculosis; Mafucci, Klein, Metchnikoff, Fischel, Nocard, and Roux have investigated the occasional occurrence of certain atypical forms found in pure cultures of tubercle bacilli. Usually, bacilli derived from tuberculosis in fowls were used, since they grew more readily and more abundantly than those found in human tuberculosis, with which they were, nevertheless, at one time considered identical. In 1892, however, Mafucci concluded that the bacilli from these two sources represented two distinct species, noting as one chief difference that very tendency to pleomorphism which had been found so frequently in the cultures from fowl tuberculosis. Bruns, on the other hand, describes experiments with human tuberculosis resulting in a complete demonstration of the occurrence of pleomorphism in this organism also. The cultures from which his preparations were made originated undoubtedly from human tuberculosis. They were, at the time of examination, five or six months old, and had never been subjected to a temperature higher than $37.5^{\circ} C.$ ($99.5^{\circ} F.$). Drying out had been prevented by the use of rubber caps. Their gross appearance was perfectly typical. The microscopical preparations were made in the ordinary way, carbol-fuchsin being used as the stain and 20-per-cent. nitric acid followed by alcohol as the decolorizer. Bruns found a complete series of transition forms, from the ordinary small, slightly curved rod containing clear spaces usually accepted as "normal" to highly complex forms composed of a main stem, having offshoots springing from them,

which themselves again might bear secondary offshoots. Following the lead of Metchnikoff, Fischel, and Mafucci, he considered this branching as real, and not merely apparent, in which he was supported by Graf, to whom he referred his specimens for examination. By countless experiments he showed that this pleomorphism was not dependent on any degeneration process due to old age (up to two and a half years) or to drying out of the media. He looked upon the branching as quite similar to that found in cladothrix,—a genus of bacteria belonging to a group generally recognized as distinctly pleomorphic. Hence the relation of the bacillus tuberculosis to cladothrix is strongly suggested. Bruns regards the branching as characteristic of the saprophytic growth of the germ, since in the animal body it is never found. The much more frequent occurrence of branching in bacilli from fowl tuberculosis he explains on the hypothesis that in human tubercle the bacillus has become accustomed to a parasitic life, and that although still capable of saprophytic existence, as demonstrated by its growth on artificial media, yet it does not return readily to its proper saprophytic form. On the other hand, the higher temperature of fowls prevents the same completeness of adaptation to a parasitic existence; so that a return to the saprophytic form occurs readily.

Avian tuberculosis very recently received a considerable elucidation through the labors of Strauss, Cadiot, Gilbert, and Roger.⁸
Feb. 12, '98 The researches of the three latter authors confirmed those of Strauss, who also recognized that the tuberculosis of parrots is of human origin, that it may be inoculated to guinea-pigs, but not to the hen; he also found that it could be transmitted to the dog.

If they are agreed as to experimental results, their opinions differ when it comes to interpretation. Cadiot, Gilbert, and Roger think that we must not be surprised if human virus retain its original properties in the parrot. They have shown that this is the case when human tuberculosis is inoculated in the hen. On other occasions, however, the bacillus of man is modified in the gallinacea and it becomes avian; but experiments have shown that this is not readily accomplished, whereas avian tuberculosis can easily be transferred and transformed in the mammalia.

The authors performed eighty-five inoculations of avian tuberculosis, taken from hens or pheasants. The sum of their investigations confirms their former conclusions and shows that the tuberculosis of the gallinacea is easily inoculated in the hen and the rabbit, and that it may be inoculated, but with more difficulty, in the guinea-pig. Of twenty-two guinea-pigs inoculated with

products taken directly from the hen, nine were found to have visceral granulations; its virulence in the guinea-pig may be increased by passing it several times through that animal, the bacillus finally acquiring some of the characteristics of human tuberculosis.

In one of their series of inoculations, lasting almost five years, the avian virus ceased to be virulent for the hen, and after three successive inoculations in mammalia. After eight successive inoculations it caused tuberculosis in the dog. It then seemed to have acquired the properties which are considered to be characteristic of the human bacillus. However, it was still possible to find, even after ten or twelve successive inoculations, guinea-pigs showing no local lesion; the virus was, consequently, not rendered stable.

Experiments must be carried out for years in order to obtain such results, and it must be remembered that the virus of the gallinacea varies considerably from one bird to another, and that all guinea-pigs have, by no means, the same sensibility; individuals may vary in their powers of resistance or of susceptibility,—a condition which must be taken into account; consequently, several guinea-pigs must always be inoculated at the same time in order to be sure of one to continue the series.

In short, both varieties of tuberculosis may be inoculated to the same animals; results vary only in their relative frequency; one species is more susceptible to human tuberculosis, another to avian tuberculosis, but none possesses a real immunity. Hence, while laying stress upon the distinctive characteristics of the two great varieties of tuberculosis, Cadiot, Gilbert, and Roger cannot make up their minds to separate completely the two viruses or to see in them anything but two races of the same species.

Backer and Bochat,³⁵_{Jan. 25, '96} conclude that the bacteria complicating chronic tuberculosis are especially the pyogenic ones (Koch's bacillus itself may act in a certain number of cases as a pyogenic microbe and complicate former infections); the most commonly found pyogenic bacteria in various forms of pulmonary phthisis are the streptococcus, the pneumococcus, and the pus staphylococci, especially the first, though with a virulence which varies exceedingly, according to the case. The staphylococcus pyogenes aureus is found most commonly in metastatic caseo-purulent abscesses. The pneumococcus is usually associated with Koch's bacillus, in capillary bronchitis and foci of perituberculous congestion of the lung. In cases of gangrene of the lung and of hæmorrhage more or less virulent saprophytic bacteria are found, a special bacteria which spread themselves rapidly throughout the system causing hæmorrhages and rapidly destroying the tuber-

culous formations. According to Gaffky the micrococcus tetragenesis is one of the most active agents of destruction of the pulmonary tissue.

Bacteria are almost always found associated with Koch's bacillus in cases of tuberculous pneumonia, pleurisy, peritonitis, pericarditis, and meningitis; local tuberculosis of the bones is generally a mixed infection in which the streptococcus pyogenes is most commonly found. This mixed infection has already been noted in acute phthisis, and according to the researches of Sauter, Hutinel, Mosny, and Aviragnet acute pneumococcic phthisis is nearly always associated with other infections.

In non-ulcerative tuberculosis, however, where tuberculosis has not been ingrafted upon tissue already attacked by a previous infection, Koch's bacillus is generally found to exist by itself, and must be looked upon as the specific cause of that disease.

Renon, of Paris, ⁹²⁷_{July 30, '96} has endeavored to immunize animals against tuberculous infection due to the aspergillus fumigatus by injection of toxins, of serums, of non-pathogenic agents, and of spores, all being more or less modified. From the negative results which he obtained he thinks that the problem of immunization of animals against this disease must be sought for in the progressively increasing injection of virulent spores.

Herbert M. King, of Grand Rapids, ⁵⁰_{Nov. 24, '94} does not believe that the bacillus originates, *de novo*, in the tubercle, but that its development from the spore is the result of the disease-process to which the necessary requirements of the life and growth of that spore give rise; that, furthermore, when the bacillus is mature and has deposited its elementary spores in the body, it has fulfilled its mission, is no longer an element of disease, and is cast from the body as an effete product.

Angelo Maffucci, ⁹²¹_{Jan. 1, '96} as the result of numerous careful experiments, feels justified in affirming that in culture preparations of tubercle where the bacilli are dead there exists a toxic substance which resists the action of time, heat, desiccation, sunlight, and gastric juice, and this subject is not a product of bacillary secretion, nor derived from the nutrient medium, but a poison contained in the substance of the bacillus itself, and due to its disintegration.

Lublinski ⁵⁰_{v. 18, Nos. 4, 5, '96} ⁸¹⁴_{Dec. 15} published his method of cultivating the tubercle bacillus. He employs the following media: 1. Four per cent. glycerin-potato broth. 2. Four per cent. glycerin-potato-broth agar-agar (without meat, peptone, and NaCl). 3. Four per cent. glycerin-potato-meat-peptone bouillon. 4. Four per cent. glycerin-potato-meat-peptone agar-agar.

For the preparation of these media 1 kilogramme ($2\frac{1}{2}$ pounds) of cleansed and finely-chopped potatoes was boiled in 1500 cubic centimetres (1 quart) of water for three to four hours and then the acid liquid filtered off. The filtrate, neutralized and with 4 per cent. glycerin added, is solution No. 1. By addition of 1 to 1.5 per cent. agar to the latter and boiling and filtering, the medium mentioned under No. 2 is obtained. The media mentioned under Nos. 3 and 4 are prepared like ordinary meat-peptone nutrient media, with this difference only: that, instead of water, potato-broth is used,—i.e., 500 grammes (16 ounces) of finely-chopped meat are macerated in 1000 cubic centimetres ($32\frac{1}{2}$ fluid-ounces) of potato-broth, allowed to stand in a cool place for twenty-four hours, then strained, 1 per cent. peptone and $\frac{1}{2}$ per cent. NaCl added, boiled until coagulation of albumin, etc. (finally, add 4 per cent. glycerin).

The results of numerous experiments upon the growth of the tubercle bacillus upon these media are as follow: 1. The tubercle bacillus grows upon the 4 per cent. glycerin-potato broth and upon potato agar-agar (prepared without meat-peptone and NaCl) just as well as upon ordinary glycerin-meat-peptone bouillon and upon agar made according to Roux and Nocard. 2. The energy of growth of the tubercle bacillus upon glycerin-potato-meat-peptone bouillon and upon agar-agar is almost twice as strong as upon ordinary glycerin-meat-peptone nutrient media; fourteen-day to eighteen-day agar cultures, in relation to the number of germs developed, present the appearance of a four-week culture upon agar-agar made according to Roux and Nocard. In addition to cultures upon the nutrient media above mentioned, which had been neutralized to give a slight alkaline reaction, the author also grew tubercle bacilli upon the same media which had not been neutralized. Contrary to the wide-spread view that the tubercle bacillus requires for its growth a slightly alkaline or, at least, a neutral medium, the author confirms the observations of Sander, who states that an acid reaction does not in the least interfere with the growth of this organism. The tubercle bacillus grows upon non-neutralized potato-meat-peptone media (bouillon and agar), the acid reaction of which is caused by the acidity of the potato and meat, just as well as upon the same media possessing a weakly alkaline reaction. (The bacillus of chicken tuberculosis did not grow upon acid media.)

The cultures of the tubercle bacillus upon acid nutrient media possess the following characteristics: 1. The agar cultures show, even in the earliest days of their growth, a yellowish-brown pigmentation. 2. The virulence of the cultures is half as strong

as those of ordinary tuberculous cultures (guinea-pigs die in forty to forty-two days after intra-peritoneal inoculation). 3. Upon microscopical examination of the cultures they are found to consist of long threads. The thickness of the threads and that of the ordinary tubercle bacillus are the same. The length is especially great in bouillon cultures. Here threads which extend across two to three fields of the microscope are often observed. In crush preparations from agar cultures the threads appear like felt. According to the length, the threads are continuous or appear wholly or partially segmented into individual rods. Lateral branchings from these threads were never observed.

Perrando⁵⁸⁹_{Feb. 18, '96}; ²_{Apr. 27, '96} studied the influence of putrid media upon tubercle bacilli and the best means of recognizing them under such circumstances. He experimented with sputum and other tuberculous products kept in a moist, warm atmosphere until they became putrid. The material used generally became putrid in two to six days, during which time the bacilli were readily recognized, and, indeed, often more easily than in fresh sputa. After ten to twenty-five days the chief morphological elements (pus-corpuscles, epithelial cells, etc.) could no longer be recognized owing to dissolution. In twenty to forty days the bacilli gradually became more granular and less easily stained by ordinary means. In forty to sixty days the bacilli underwent dissolution and could no longer be recognized as such. Quite early in the process of putrefaction minute fibrils of elastic tissue were deposited. Bacteriological examination of the contents of the tympanic cavity often reveals the presence of tubercle bacilli in the rare cases where other and more usual parts are unavailable for examination. The conditions of fluid in the tympanic cavity of the dead are not unlike those of the author's experiments. Tubercle bacilli are possibly driven through the Eustachian tube into the tympanic cavity during life by coughing.

Diphtheria.

The general bacteriology of this subject is given in the first volume of the ANNUAL. Under this head, therefore, will only appear reviews of articles bearing directly upon the Loeffler bacillus.

F. Schanz, of Dresden,⁶⁹_{No. 42, '94} finds that the bacillus of xerosis conjunctivæ is absolutely identical with Loeffler's bacillus, either in preparations or cultures, the only difference being that the Loeffler bacillus is toxic for the rabbit, while the xerosis bacillus is not; but, as the former is variable in its toxicity, the two bacilli cannot be regarded as distinct micro-organisms.

Palmicki and Orlowski,⁵⁵¹_{Feb. 16, '96} show that cultures of diphtheritic bacteria give the same reaction as mineral acids (muriatic and sulphuric) on indol and as cultures of cholera bacteria; by the addition of acid a purple-rose coloring is obtained. Young cultures do not give the reaction, but those three weeks old give it very distinctly. According to their experiments, the presence of indol, together with azolitmin, is necessary to obtain the reaction. In young cultures there is little, if any, azolitmin, and, therefore, the reaction is not obtained in spite of the presence of indol, which gives the other distinct reaction, such as Légal's reaction. The experiments also prove that cultures filtered through a Chamberland filter gives, with acids, a rosy color, whereas the filtrated bodies of bacteria do not show such coloring. (Report of Corresponding Editor Drzewiecki, of Warsaw, Poland.)

Tochtermann, of Unverricht's clinic,⁸¹⁹_{Oct. 5, '96}²_{Dec. 30} describes a new serum cultivation medium. Blood-serum is looked upon as the most favorable medium for this bacillus. In Loeffler's serum the streptococcus which grows well on agar does not thrive; other cocci, however, flourish, and the naked-eye appearances of the colonies is but slightly distinctive. Hueppe's method with agar and serum constituted an advance, but the difficulties of sterilizing the serum remained; for this reason agar often takes the place of serum, but the colonies take longer to develop on it, and do not exceed a certain limit. It is possible that other constituents of the serum, apart from the albumin, may be responsible for its value in this relation. With this view the author has heated serum along with agar, and filtered off the precipitate. He has tested the value of the nutrient medium thus prepared. After making various comparative experiments he recommends the following method: A 2-per-cent. watery solution of agar is treated in the usual way with peptone (1 per cent.), common salt ($\frac{1}{2}$ per cent.), and then 0.3 to 0.5 per cent. of grape-sugar is added and the whole filtered. The filtrate is heated from a quarter to half an hour with serum from sheep's blood in equal parts, or 3 of serum to 2 of the agar solution. The filtrate is then put into tubes and sterilized in the usual way. The blood itself need not be previously sterilized, and the serum can be poured off after twenty-four hours' standing. As much agar as possible must be got into solution, and this is effected by prolonged soaking and warming. The ordinary sterilization is practiced without any ill effect to this nutrient medium, and even a stay of one hour to an hour and a half on successive days in the steam-sterilizer does not impair its value. It is well, however, in preparing the agar, not to let it filter in the steam-sterilizer for hours together. The suspected

material is well distributed over the surface with the platinum needle. Round colonies, white in color with a darkened centre, and presenting a granular aspect, appear in twenty-four, often in twelve, and sometimes in eight hours if the diphtheria bacillus is present. It remains to be seen whether other micro-organisms partial to serum media will grow equally well on the foregoing.

Ledoux-Lebard ¹¹⁸_{v.12,p.66,74, Oct.16,76} ⁸¹⁴ states that the action of diffused light does not prevent the development of the bacillus at ordinary temperatures. Direct sunlight arrests this development and sterilizes the culture-bouillon in a few days. Diffused light has no bactericidal action on diphtheria bacilli in dilution in neutralized bouillon, but has a pronounced action on them when in distilled water. It destroys the vitality of dry cultures in thin layers after twenty-four hours of exposure. Sunlight acts similarly, but with greater rapidity. This bactericidal power of light is confined almost exclusively to the most refracted rays of the spectrum. The least refracted rays have almost no effect. Light can therefore be regarded as a prophylactic agent against the disease and can therefore be used as a disinfectant. Its action on bacilli in false membranes is very weak under any circumstances.

Spronck ²⁶²_{Oct.25,76} ²_{Dec.21,76} has investigated the causes of the well-known differences in the amounts of toxin produced by diphtheria bacilli grown under apparently precisely the same conditions. Owing to want of space he was not able to grow the bacilli in thin layers of bouillon, but was compelled to use cylindrical vessels with straight necks plugged with wadding. The layer of bouillon was four inches deep; it was prepared from veal or beef, alkalized with sodium carbonate, and peptonized with 2 per cent. of Witte's peptone. In the series of experiments all the conditions were identical except for the differences in the bouillon which will be mentioned. The course of development of the culture can be classified under three types: 1. Acidity soon appeared, persisting for weeks or months. The liquid became clear, the bacilli dying and sinking to the bottom. When this had occurred the toxicity became and remained extremely feeble. 2. The bouillon never became acid, but remained turbid, with a thick deposit at the bottom and a whitish scum on the surface. After awhile the alkalinity gradually increased, and the toxicity at the end of two or three weeks was extremely powerful. 3. After a few days the bouillon became acid and clearer; in a short time more the alkalinity and turbidity returned and toxic properties developed to a considerable extent, though not so great as in No. 2. These differences depend upon the freshness of the meat from which the bouillon is prepared; the toxicity varies inversely with the amount

of glucose present and directly with the length of time which the meat has been kept before cooking. Thus, perfectly fresh beef (veal being still less good, and horse-flesh, according to Smirnow, yielding almost no toxin under any circumstances) approaches the first type, while meat which has been kept till the inception of decomposition is of the second, the third being intermediate. This has been confirmed by using different portions of the same joint, which, by alterations in the time of keeping, could be made to furnish varying amounts of toxin. Furthermore, the addition of glucose was found to inhibit the toxicity of the products of diphtheritic growth even in bouillon made from quite stale meat. Spronck therefore suggests that the most convenient method of obtaining strong toxin is to eliminate the glucose in the meat by keeping it till decomposition commences before making it into bouillon. He further considers that it is not yet certain that the artificial aëration method of Roux and Yersin is, in all cases, necessary, or, indeed, advisable, when a material of powerfully toxic properties is required.

Plague.

Kitasato ¹⁵ has isolated from the blood of human beings suffering from bubonic plague a new bacillus possessing the following qualities: (1) it occurs in the blood, in buboes, and in the internal organs of the plague-stricken only; (2) it is not to be found in any other infectious disease; (3) with this bacillus it is possible to produce in animals the identical symptoms which the disease presents in human beings. From this it may be concluded that the bubonic plague is an infectious disease produced by a specific bacillus. The author presumes that these bacilli enter the system by three channels,—viz., respiration, external wounds, and the intestinal tract. The micro-organism obtained in all instances consists of short rods with rounded ends, resembling the bacillus of chicken-cholera and possessing a capsule. This capsule is at times quite distinctly marked; at others it is difficult to see. The bacillus stains in aniline dyes, the ends staining more deeply than the middle portion. According to Yersin, it is decolorized by Gram's staining method. It is described by Kitasato as being very motile.

Upon blood-serum, after twenty-four to forty-eight hours at the body-temperature, the bacillus grows abundantly, the growth appearing moist and of a yellowish-gray color. No liquefaction of the blood-serum occurs. It also grows upon agar, but better upon glycerin-agar, forming a grayish-white surface growth. The colonies in agar plates show a bluish translucence. They are

round or present slightly irregular contours, and are moist in texture. The young colonies are glass-like in appearance, but in the older ones the central part becomes thicker and more opaque. In bouillon, according to Kitasato, a cloud is produced, whereas Yersin compares the growth in this medium with the appearance produced by the streptococcus erysipclatis,—namely, the formation of small granules which settle upon the sides and to the bottom of the test-tube. Stab cultures show after one to two days a fine, dust-like line of growth. The bacillus does not grow on potato, in ten days, at the ordinary temperature, but after two days at the temperature of 37.5° C. (99.5° F.) a growth, gray in color and with a very dry surface, was observed. The mean temperature of Hong Kong was too high to permit of gelatin being used.

The most favorable temperature for the growth of the bacillus seems to be from 36° C. to 39° C. (96.8° F. to 102.2° F.). According to Kitasato, it does not form spores. Cover-slip preparations from young agar-agar cultures show forms resembling chains of cocci, but older ones present distinct bacillary forms.

Yersin, Calmette, and Borel ²⁰²_{July, '96} state that the inoculation with warmed plague culture immunizes against a later inoculation, provided that the second be performed only when the animal has completely recovered from the first inoculation. The preventive and healing action of the serum of animals thus immunized is really remarkable. In fact, such serum affords protection against subcutaneous inoculations of virulent plague, and cures after an inoculation of the latter if injected twelve hours later. The authors, encouraged by such results, undertook to immunize a horse, which they did in six weeks. The serum of the horse succeeded, both as a preventive and a therapeutic agent, when injected into rabbits, guinea-pigs, and mice.

Tetanus.

F. F. Westbrook, of Cambridge, ²⁴⁷_{Nov., '91}; ⁴⁵¹_{Feb., '96} conducted experiments on the effects of sunlight on tetanus cultures which strongly confirm the conclusions arrived at by Downes and Blunt, Duclaux, Roux, and others, that oxygen is a necessary factor in the destruction of bacteria by light. Not only is this so, but an actual diminution of the contained air was shown to take place during the time of exposure of cultures in air. Whatever the process consists in, the larger the surface exposed, the more rapid is the destruction when equal volumes are exposed. At present we have not sufficient data to say exactly what this process is, any more than to enable us to know that in the absence of oxygen the sun

is powerless to produce any harmful effect on the bacteria exposed to it.

Tetanus cultures are completely killed on prolonged exposure to the sun in air, though it is possible to stop at a point where the pathogenesis vanishes, while life still remains in the spores.

From the limited number of observations, it would appear as if those spores which survive the sun's action are capable of producing on re-inoculation into fresh tubes not only quite as virulent cultures as before, but the pathogenesis seems to be increased. It is also very evident that it is possible to inject into mice living tetanus spores without producing symptoms of any kind. Whether this is due to the smallness of the dose, to a temporary attenuation, or to the fact that, in the absence of the poison, tetanus spores are harmless is a question which, at the present time, must remain unanswered, and must be left until further research throws more light upon it.

Righi ⁵⁸⁹_{No. 202, '94} asserts that he has been able to secure the growth of the tetanus bacillus aërobically. The process by which this was accomplished was the transplantation of the highest part of old agar-agar puncture cultures. In the highest parts of these the bacilli were accustomed to a certain amount of diffuse oxygen, and by the frequent transplantations readily allowed themselves to be introduced gradually to the free atmosphere. By this means Righi secured aërobic growths upon agar-agar and upon gelatin.

W. Hübener ⁶⁰_{No. 22, '94} has verified the assertions of Tizzoni as to the immunizing value of his antitetanic serum. His experiments show that the immunizing value of the serum amounts to but one for thirty millions, and not one for one hundred millions as Tizzoni affirms. Consequently this serum will not suffice for the cure of serious cases or of cases treated tardively, even if administered in doses of from 200 to 400 cubic centimetres ($6\frac{2}{3}$ to $13\frac{1}{3}$ fluidounces).

Tizzoni ⁶⁰_{No. 22, '94} ascribes the difference which Hübener found in the immunizing value of his antitoxin to the method which he used; he admits that Ehrlich's method, adopted by Hübener, is more convenient than Behring's method, but, whatever be the method employed, the valuation of the minimal mortal dose must always be somewhat arbitrary; it would have, consequently, been much better to employ the same method for a comparison of the results.

The chief objections made by Hübener, that Tizzoni's serum is not active enough to cure a case of serious tetanus is opposed by clinical evidence, for Tizzoni can quote among those cured a case of tetanus of the head and a case of tetanus neonatorum.

Anthrax.

Kerry, ⁸⁸⁰_{No. 17, '94} with the dried blood of a cow which had died with every appearance of symptomatic anthrax, infected a guinea-pig; this animal died with similar symptoms. From the sanguineous effusion permeating the subcutaneous tissue and the muscles around the region inoculated he obtained bacilli which, when cultivated, showed important differences from those of symptomatic anthrax,—they neither contained spores nor showed the characteristic club-like shape. The internal viscera and the peritoneal exudation were sterile. Inoculation of a second guinea-pig with a culture of the sanguineous effusion from the first guinea-pig gave a like result. This second culture, after having been kept in the incubator, contained the same bacilli, but the latter were now furnished with thick, spiral, and very long cilia. The bacillus does not grow at the ordinary temperature, but requires one of 26° C. (78.8° F.), at which it gives off a small amount of gas. However, the most favorable temperature is that of the incubator. Cultivated on sweetened agar-agar, the cilia soon shorten, become narrower and more difficult to stain; simultaneously the virulence of the bacilli diminishes unless lactic acid and glucose are added. Kerry's bacillus is pathogenic for the rabbit and mouse, while the contrary is the case with the bacillus of symptomatic anthrax. Kerry adds that his bacillus is not the bacillus of œdema nor the bacillus of pseudo-œdema described by Sanfelice. The knowledge of this new bacillus may, perhaps, explain the frequent lack of success in vaccinating against symptomatic anthrax.

Intestinal Sepsis.

E. Lévy ²⁷⁸_{B.M.H.S.A., '94} publishes an article on experimental and clinical researches on sepsin poisoning and its connection with proteus vulgaris (Hauser). He first classifies the symptoms described by von Bergmann and Schmiedeberg in 1860 as characteristic of disease caused by sepsin (vomiting, bloody diarrhœa with tenesmus, and sanguineous extravasations under the left endocardium). While endeavoring to separate bacteriologically the micro-organisms from a very active and putrid yeast, the proteus or bacillus figurans was found to be the most important of the bacteria present. A typical example of sepsin poisoning was obtained by the intra-venous injection into dogs of from 5 to 10 cubic centimetres (1½ to 2½ fluidrachms) of a liquid gelatin culture obtained from putrid and septic beer-yeast. The blood contained no bacteria,—an important circumstance with reference to a decision as to the action of the species of proteus. From

analogous experiments made by injecting the products of the proteus vulgaris it has been undoubtedly proved that the disease caused in experiments on animals with this microbe is really a poisoning. Symptoms of such a condition govern the entire appearance of the disease, while symptoms caused by living organisms are completely wanting. Lévy further proves how important, from a practical point of view, is the infection by the proteus vulgaris in human pathology. He gives an account of an epidemic of poisoning in an inn near Strassburg, the main symptom being sanguineous cholera, involving eighteen cases and one death. The proteus had grown in the ice-chest containing the meat and infected the latter. This was greatly due to the fact that the proteus is capable of developing at a low temperature. Although the case of meat poisoning observed by Lévy was an intoxication caused by sepsin, it has been proved by him, from the cases of meat poisoning recorded in the literature of the subject and minutely examined from a bacteriological point of view, that the proteus must be looked upon as the exclusive cause of the poison, since it was completely wanting in a number of the cases; the bacteria found belonged much more to the bacterium coli commune group. Since, in these cases of poisoning, or, at least, in a part of them, the symptoms appeared when the meat had been cooked or used for soup, the poisoning can only have been caused by the products of metabolism contained in the bacteria.

The poisons which result from putrefaction of organic substances are only formed at a certain stage of the process of putrefaction. Later on they disappear again, as they are transformed by the micro-organisms themselves into simpler and less poisonous compounds. It is therefore advisable to put, without delay, into absolute alcohol the suspicious objects—like meat, sausage—which are to be chemically examined; the poison will remain unchanged for a long time, so that experiments with animals can be made.

Physical Properties of Bacteria.

Cilia.—Ferrier ²⁷⁸_{Jan., '96} publishes some general considerations on the pleiomorphism of the vibratile cilia of some motile bacteria. After trying the various methods he adopted the following, the principal object being to diminish precipitation: A small portion of a culture on solid medium was taken and diluted by shaking in a test-tube containing 3 to 4 cubic centimetres ($\frac{3}{4}$ to 1 fluidrachm) of sterilized water; a drop of the mixture is then placed on a cover-glass (previously passed through the flame) and dried under cover. A freshly prepared fuchsin ink was used as mordant, care

being taken to filter it just previous to use; the cover-glass was placed face downward in a watch-glass filled with the ink; it was then heated for four or five minutes, until some vapor was given off, then washed freely and treated with alcohol at 95 degrees. Finally it was stained, the cover-glass being placed face downward in a watch-glass filled with cold concentrated solution of fuchsin in aniline-water. These steps are given in detail to illustrate the care with which the examination was conducted.

Bacterium Coli.—The greater proportion have 3 cilia, some from 5 to 6 cilia; some have none. There exists a peripheral areola which is lighter than the remainder of the bacterium, and which appears to be in continuance with the cilia. The cilia diminish or vanish in old cultures unless the tubes are closed by India-rubber caps (twenty-eight days). They diminish also at a temperature of from 37° to 44° C. (99.8° to 111.5° F.) and no longer exist at 46° C. (114.4° F.). Very large cilia are sometimes seen at 18° C. (64.4° F.). The cilia are diminished in number by antiseptics, such as carbolic acid and especially potassium bichromate. A single passage through an animal causes no changes.

Typhoid Bacillus.—There are 10 to 12 cilia; some bacilli have but 2 or 3 and some have none. Antiseptics diminish their number.

Pneumobacillus Bovis.—Numerous cilia; loss of the liquefying power for gelatin causes no change.

Bacillus Subtilis.—It has from 6 to 7 cilia. Koch stated that there was only 1 at each extremity. The cilia generally disappear at 46° C. (114.4° F.).

Hog-cholera.—There are from 4 to 7 cilia of from 35 μ to 50 μ long (spider). After four successive inoculations in an animal the micro-organism is more bacillus-like; there are then from 1 to 3 cilia of 20 μ long and it is narrower. The number and the length of the vibratile cilia seem to be inversely proportionate to the size and virulence of the micro-organism; they diminish in number and length as the latter lengthens and becomes more pathogenic and remote from saprophytic life. The number of cilia consequently vary in the species itself, especially under the influence of temperature, of antiseptics, and of passage through the living system. The length and external aspect also vary considerably; thus, the cilia of the bacterium coli when lengthened cease to be undulating and become rectilinear. The cilia appear to be the most easily affected portion of the micro-organism. Their examination may aid in the diagnosis between the bacterium coli and the typhoid bacillus, provided that their number is not looked upon as an absolutely sure characteristic, that bacteria as

far apart as possible be compared, and that the examinations be made at the temperature of 37° C. (99.8° F.). The cilia as well as the areola seem to be protoplasmic in nature, and, like protoplasm itself, stain faintly. Their great variability is explained by the great sensitiveness of the protoplasm.

V. Babès, of Bucharest,⁵⁸ publishes an important article on metachromatic corpuscles, spores, ramifications, and capsules of pathogenic bacteria, illustrated by the annexed colored plates. On the whole, the author concludes that certain peculiarities are thus shown which allow of the recognition of a relationship between these bodies and capsules. As regards the metachromatic bodies, the author lays claim to the priority of their description, especially those of tuberculosis, actinomycosis, and leprosy. They may also occur, however, in the higher fungi, outside of the varieties described by Bütschli,—the streptothrix *Fosteri* and a fungus found in the gangrenous regions in noma.

The bud-formation and ramifications of the bacteria may be traced through all the varieties, beginning with the streptococcus; the nature of the process can be clearly recognized in the latter. Particularly in the cases where it is completed in the interior of a capsule or sheath (streptococci, anthrax bacilli) it is very plainly discernible. With respect to these formations, the group of bacteria having a certain relation with the diphtheria bacillus, also the tubercle bacillus, leprosy bacillus, and actinomyces fungus, are all allied to the streptococcus.

The club-formation is referable to the formation of relatively permanent conditions and a capsule-like sheath, which fact was already demonstrated in the actinomyces fungus and also in other forms.

The capsule-formation bears the closest relationship to the formation of protective conditions in unfavorable conditions of life. Certain forms of bacteria contain in their colonies large encapsulated bacterial groups, in which the development of the same takes place in a peculiar manner. The structure of the capsules is not always simple, not only in the actinomyces, but also in other forms of bacteria; a concentric arrangement of the capsules is demonstrable, this being particularly the case in mycogenous bacteria, where a combination of regularly arranged, pale, honey-combed granules can be observed.

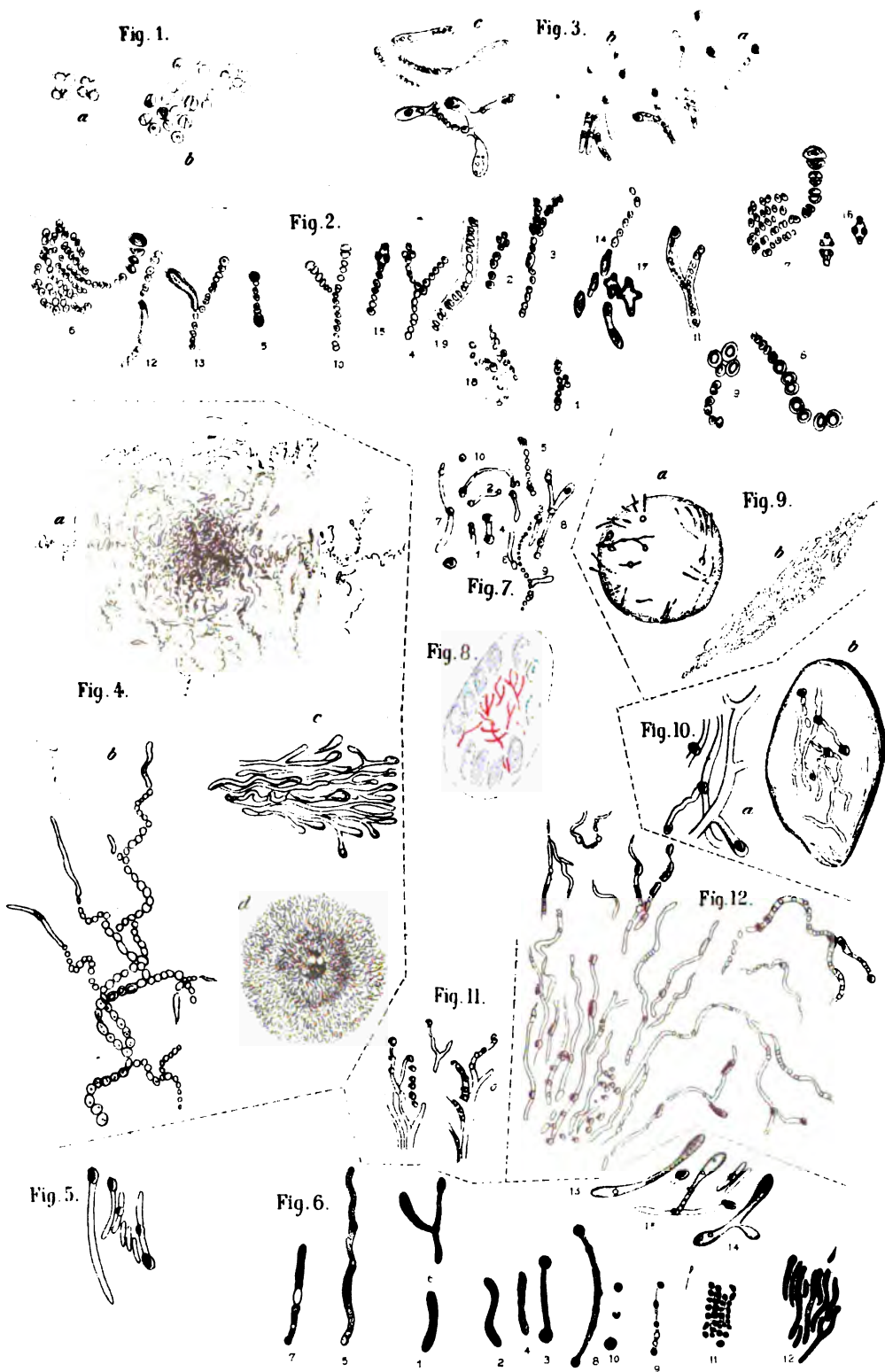
The formation of the swelled masses at the ends and sides of certain bacteria is closely allied to the capsule-formation; probably, also, the formation of pale corpuscles in the culture of some forms of streptococci and staphylococci, as well as the peculiar lateral fissures in certain bacteria. The formation of reticulated mucous

masses may likewise be referred to a modified capsular formation; the same is the case with regard to the cortical substance surrounding the central bodies of bacteria and the swelling of the outer membranes. The excessive development of capsular substance may lead to the formation of isolated homogeneous capsular masses or may cause the disappearance of the bacilli.

The cilia-formations of the bacilli are in intimate relation with the capsules of the bacilli, and prove that the bacteria are surrounded by various coverings of different nature. This circumstance shows that the cilia are not to be considered as a secretion of the bacillus, but as a swelling or protrusion of a sheath pertaining to bacteria not distinctly capsule-forming in nature.

Description of Plates.—Plate I. Fig. 1. Subdivision-direction of cocci. Methylene-blue. Enlarged 2000. (a) Tetrads. (b) Staphylococcus aureus. 1. Blue-colored corpuscles. 2. Rather larger, pale corpuscles. 3. Pale corpuscles in connection with dark cocci. 4. Tripartite arrangement and metachromatic substance. Fig. 2. Pathogenic streptococci. Methylene-blue. Enlarged 1000. 1. Chain with change in subdivision-direction at two points. 2. Chain with rhomboid group at the end. 3. Chain with a decussation caused by a single deviation of the plane of division. 4. Ramification caused by outgrowth of a rhomboid cell-group. 5. Chain with two terminal enlargements. 6. Outgrowth of chains from a colony with club-form enlargement of terminations. 7. Similar process with metachromatic bodies upon the enlarged terminal cocci. 8. Enlargement of members on blood-serum. 9. Enlargement of members upon blood-serum, particularly at the terminal group of four. 10. Branch- and club-formations. 11. Branch-formation and chromatic terminal bulb. 12. Rod-formation in the centre of chain. 13. Bud-formation in the form of a club-shaped rod. 14. Lancelet-formation in the centre of a chain. 15. Terminal lancelet with chromatic points. 16. Lancelet-bacteria (pneumonia) with metachromatic bodies, division of bacteria. 17. Bilateral outgrowth of lancelet-formations (infect. hæmorrh.). 18. Degeneration of the chains. 19. Metachromatic bodies and spore-formations of a streptococcus (scarlatina) with sheath. Fig. 3. Diphtheria bacilli and similar formations. (a) Diphtheria bacillus from a fresh culture. Methylene-blue. Enlarged 1000. Bud-formation. (b) Pseudodiphtheria bacillus (angina). (c) Pseudodiphtheria bacillus (polyarthritide). (d) Air-fungus colony. Enlarged 60. (e) Cover-glass preparation. Enlarged 500. Bud- and club-formations. Fig. 4. (a) Air-fungus colony. Enlarged 60. (b) Chain-formation, ramifications and terminal rods. Enlarged 600. Fig. 5. Fibre-formations and metachromatic bodies in bacillus of glanders. Potato cultures. Enlarged 1300. Fig. 6. Bacillus of tuberculosis. Bouillon culture according to Ehrlich-Ziehl. Enlarged 2000. 1. Nearly homogeneous rods. 2. Metachromatic corpuscles in the vicinity of one end of the bacillus. 3. Two hypertrophic metachromatic corpuscles. 4. Metachromatic bodies and vacuoles. 5. Fibre-formations with metachromatic substance and vacuoles. 6. Ramifications in the region of a metachromatic body. 7. Metachromatic corpuscles and vacuoles. 8. Fibre-formations: pale fibres, numerous metachromatic bodies, hypertrophied, particularly at the extremities. 9. Very thin degenerated fibre with metachromatic corpuscles. 10. Isolated metachromatic corpuscles. 11. Nuclei-formations from accumulations of bacilli. 12. Bacilli fungus of superficial skin on bouillon. 13. Club-formations of avian tubercle bacillus, containing luminous nuclei. 14 and 15. Formation of club-shaped proliferations in above bacillus. Fig. 7. Superficial skin of bouillon of tubercle bacillus, intensely colored with methylene-violet. Metachromatic bodies colored red. Blue and red nuclei plainly distinguishable, as well as ramifications. Fig. 8. Tubercle giant-cells. Ramifications of the bacilli in the interior of a giant-cell. Fig. 9. Leprosy-cells. (a) According to Ehrlich, a vesicular, swollen, and degenerated cell. Ramifications are noticeable at the ends of the leprosy bacilli in the shape of elongated, pyriform, or rounded chromatic bodies, in the centre of which spore-like light-colored formations can be seen. (b) Leprosy-cells colored by methylene-violet, showing ramifications and chromatic formations. Fig. 10. (a) Older cultures upon sugar-agar, showing ramifications, metachromatic corpuscles and spores. (b) Degenerated cells, containing ramified actinomyces fibres. With appropriate treatment metachromatic corpuscles may be recognized therein. Fig. 11. Actinomyces-like ramified fungus in the interior of the gangrenous portions.—methylene-blue, enlarged 1000,—with metachromatic corpuscles. Fig. 12. Streptothrix Fosteri from a concretion in the tear-duct. Methylene-blue. Enlarged 1000 times. Ramified fibres with chromatic bodies and vacuoles.

Plate II. Fig. 13. *Ascrobacterium luterum*. (a) Colonies 60 times enlarged; the capsules, arranged in the form of a ramified net-work, may be seen in the centre. (b) Contents of the colonies 800 times enlarged. 1. Bacteria from the peripheral zone, either with or without capsules, forming more or less thick bacteria and rods. The ends of the capsules are more



Metachromatic Organisms (Babes)





Fig. 13.

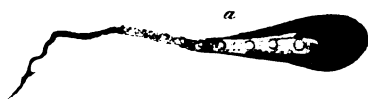


Fig. 14.



Fig. 15.

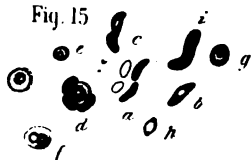


Fig. 16.

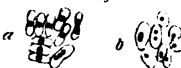


Fig. 17.



Fig. 18.

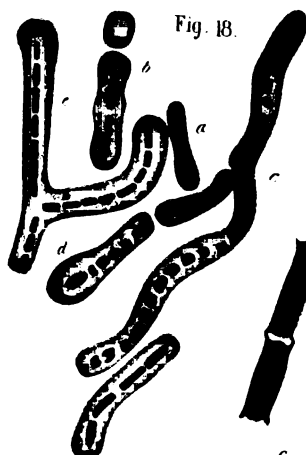


Fig. 19.



Fig. 20.



Fig. 22.



Fig. 23.



Fig. 24.



Fig. 25.

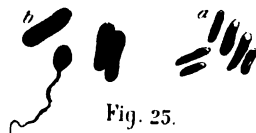


Fig. 26.

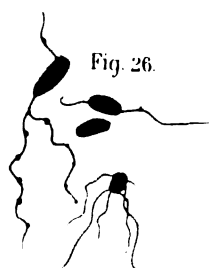
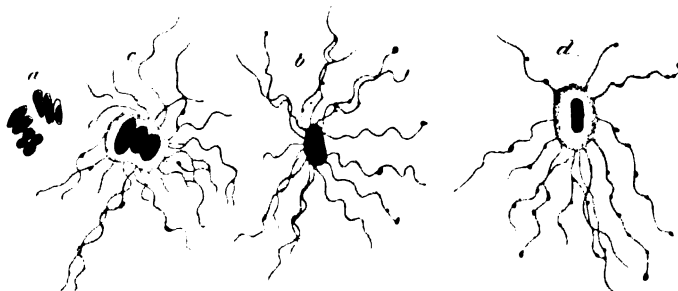


Fig. 27.



Metachromatic Organisms (Babes)

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darkly colored. (2 to 9. Central capsules.) 2. Large cocci, resembling streptococci, ranged in the interior of the large capsule. 3. Separation of the very much enlarged corpuscles into various layers. 4, 5, and 6. Division into accumulations of cocci. 7. Division into bacilli. 8. Bacilli emerging from the capsule. 9. Division into two rows of chains. Fig. 14. Actinomyces colored with Gram and with safranin-aniline-iodine. Enlarged 800 times. (a) Stratified capsule surrounding the hypertrophied termination, forming spores. (b) Fibres with knob-like terminations. 1. Interior of the capsule. 2. Proliferation of the capsular substance. 3. Free club-formations in lymph-spaces. 4. Free fibres. Fig. 15. Curved spore-forming bacillus and formation of capsule-spores. (a) Bacillus. (b and c) Endogenous spore-formations. (d) Capsule-spore surrounded by bacilli. (e and f) Free capsule-spores. (g) Chromatic corpuscle surrounded by a capsule. (h) Elongated free spores. (i) Formation of central body. Fig. 16. Haemorrhage-causing bacillus. Methyl-violet. Enlarged 1000 times. (a) Terminal tumefactions. (b) Capsular formation. Fig. 17. Pathogenic mycogenic bacillus in angina Ludovici. Methyl-violet. Enlarged 1000 times. (a) Bacillus with pale, indistinct terminations. (b) With swollen, pale-colored ends. (c) With granular, honey-comb, differential tumefactions at one end. (d) Tumefactions in lateral portions. (e and f) Granular tumefactions in lateral portions. The granules are arranged in rows. (g) Tumefaction with disappearance of the bacillus. (h) Bilateral tumefaction. (i) Two granular rows without bacilli. Fig. 18. Pseudoramification. Ramifications and capsule-formations of anthrax bacillus in the blood of a mouse twenty-four hours after death. Loeffler's rubin. Enlarged 800 times. (a) Bacillus, in the centre of which a thin rod (central body) can be distinguished. (b) Tumefied bacillus with capsule and severed capsular portion. Pseudoramification with cylindrical capsule and short portions of bacilli; at the end of a ramification a club-shaped enlargement (d). (c) True ramifications. Fig. 19. Anthrax bacillus with lateral pallor and a dark axial line. Fig. 20. Bacilli in noma with central body or capsule-formation and longitudinal fissure. Fig. 21. Large air-bacillus. Methyl-violet. Enlarged 1500 times. Central body, showing rod-like prolongations, by means of which the bacilli hang together in chains. Fig. 22. Large mycogenous bacilli with central body and radiating capsular granules. Methylene-violet. Enlarged 1000 times. Fig. 24. (a) Friedländer's bacillus with concentric capsule. (b) Division of the bacillus in the interior of the capsule. (c) Fränkel's pneumococcus with ramification in the interior of the capsule. Fig. 25. Bacillus resembling typhus bacillus, rounded in form and having cilia. (a) With ordinary coloring. (b) According to Bunge. Fig. 26. Another typhus-resembling bacillus, 1500 times enlarged, according to Bunge's method. Light portions in the interior of the central rods, granules, and vacuoles upon the partially ramified cilia. Fig. 27. Typhus bacillus 1500 times enlarged. (a) Colored with rubin. (b) Treated according to Bunge. (c) According to Bunge, a group of bacilli in a common capsule. (d) Single bacillus with capsule and central body. Cilia extending from the capsule.

Fluorescence.—C. Lapierre¹²⁶
Jan. 15, '96 publishes a series of researches on the fluorescence-causing function of bacteria. He discovered in cistern-water a pathogenic fluorescent bacillus which as yet has not been described; it was from 2μ to 3μ in length, 0.5μ wide, with rounded ends, either straight or slightly curved, and almost motionless. At one extremity there was a cilium; it stained well with aniline dyes and lost its stain by Gram's method. It could be grown in bouillon and on gelatin, which it did not liquefy. At the beginning it manifested pathogenic power, which was especially marked in the rabbit and guinea-pig (caseous abscess, generalized peritonitis), but which diminished with successive cultures.

The fluorescence seems to be in a certain way non-dependent upon its growth. The former does not show itself unless the general conditions of the nutrient medium (temperature, form of nitrogenous or carbonated food, etc.) are favorable. It does not seem to be exclusively connected with a certain chemical element or function, widely-differing molecular groups often manifesting it. Neither does it depend upon the existence or the relative amount of phosphates, though a certain amount of these are

needed for the vitality of the species. The addition of phosphates does not produce phosphorescence in a medium in which it did not show itself from the beginning.

Thermophilic Bacteria.—Macfadyen and Blaxall²⁴⁷_{Nov., '94}¹_{Aug. 24, '95} found twenty or more varieties of heat-resisting bacilli in water, mud, garden-soil, street-dust, faecal matter from human beings and various animals, sewage, and other filth. These micro-organisms thrive on agar, potato, and other ordinary culture-media kept at a temperature of 55° to 65° C. (131° to 149° F.). Hardly any of them would grow below 50° C. (122° F.), and four kinds would not grow at a temperature below 60° C. (140° F.). Boiling for ten minutes did not destroy the latter. They actively decompose proteids, producing H₂S, and give rise to a repulsive odor. They can probably cause also a fermentation of cellulose. Most of these heat-resisting bacteria grow only in the presence of oxygen; but a few are feebly anaërobic. Like the bacilli studied by Globig, these are probably not in any way disease-producers.

Lydia Rabinowitch,⁵⁸_{v. 20, p. 155} citing these and other studies, including Globig's work, studied the same question and found eight kinds of bacilli growing at temperatures between 60° and 70° C. (140° to 158° F.). They differed in coloration of growth, and when grown in bouillon cultures at 62° C. (143.6° F.) some kinds produced acid, some alkali. They hardly grew at temperatures above 75° C. (167° F.), but resisted prolonged boiling and remained alive even after five or six hours of exposure to streaming steam or after months of dry heat, as on the top of an oven. These highly-resistant bacteria seem free from disease-producing qualities, if one may judge by the results of experiments upon mice and pigeons. While found in milk, in various other food-products, in the excrement of various animals, and in earth from different sources, these bacilli were most abundant in barley in the middle stage of the germinative process.

Penetration Powers.—H. Hill³⁹_{July, '96} conducted a series of experiments to determine the relation between the possession of motility by bacteria and their ability to penetrate wet cotton. The following conclusions were reached: 1. Motile bacteria penetrate wet cotton in any direction readily, the rate of passage varying for different species with the relative activity of their motility. 2. Non-motile bacteria pass downward through wet cotton readily. 3. Non-motile forms may pass upward through wet cotton, but such passage is very slow,—from some days to two or three weeks. 4. Aërobic forms which are also motile may utilize their motility to resist gravitation; so remaining at or near the surface of a liquid medium exposed to oxygen.

Gas-forming Powers.—A. A. Orlowski,¹¹⁵⁸_{July 12, '96} publishes the results of some experiments on H_2S as a product given off by some bacteria. The following are the results which he has obtained: The best method of determining the sulphuretted hydrogen given off by the bacteria is to use sheets of lead moistened with basic lead acetate; on the following day even the extremity of the suspended leaden sheet is blackened by the slightest trace of sulphuretted hydrogen. The bacteria which give off the most H_2S are: Eberth's bacillus, the microbes of mouse-septicæmia and of hog-cholera, and the bacterium coli commune, the last three giving it off much more slowly than the former. The bacillus of chicken-cholera, the comma bacilli of Deneke, Miller, Chetschrekoff, of cholera Asiatica, of Finkler-Prior, the rhinoscleroma bacillus, that of Friedländer, and, finally, both the staphylococci aureus and albus give off very little sulphuretted hydrogen. The addition of metallic salts to cultures is much more important for the diagnosis. Cultures on gelatin are especially characteristic, while agar-agar cultures are useful only for the bacterium coli commune and Eberth's bacillus.

Action of Pressure on Micro-organisms.—Roger⁸_{Dec. 5, '94} conducted a series of experiments to determine the effects of high liquid pressure upon growing bacteria. The streptococcus of erysipelas and bacillus coli communis and anthrax bacilli were found, in the first series of experiments, to withstand 1000 to 3000 kilos successfully. A second series showed that non-sporiferous anthrax bacilli are killed in large numbers by a pressure of 2000, but especially 3000 kilos (967 to 2900 atmospheres), and that those which continue to live are diminished in virulence.

Effects of Metals on the Growth of Bacteria.—Meade Bolton, of Philadelphia,⁹⁰_{July, '96} studied the effects of various metals on the growth of bacteria. The author followed Miller's methods, using cultures of various micro-organisms,—staphylococcus pyogenes aureus; anthrax, cholera, and typhoid bacilli; bacillus coli communis; bacillus prodigiosus, and bacillus pyocyaneus. Agar plates were used, a large amount of culture being inoculated into the melted medium. The metals were put on as soon as the plates were made.

The usual effect was the production of a clear space immediately around the piece of metal—a zone of inhibition—and between this and the normal growth an intensified zone, varying in width and distinctness, but always narrow in proportion to the clear zone. Eleven figures are given, showing the appearance of the culture-plates with these zones. Copper, brass, silver, magnesium, zinc, and iron, all showed a clear zone of inhibition and

also an intensified zone of increased growth. In the case of magnesium gas-bubbles were formed, which raised the bit of metal above the medium; with zinc there was a milky discoloration all around the metal, discoloration being also noticed in the case of iron. Platinum, platinum black, aluminium, silicon, niobium, and also charcoal failed to give any reaction. Gold showed no inhibition with staphylococcus pyogenes aureus, bacillus coli communis, typhoid bacillus, or cholera bacillus. In some cases there was inhibition of growth of anthrax cultures when the gold had not been recently "glowed."

Pure cadmium gave strikingly different reactions with different micro-organisms. With staphylococcus pyogenes aureus there was a clear zone, varying in width, but no markedly intensified zone. With the bacillus coli communis the clear zone was surrounded by a very markedly intensified zone, almost as wide as the clear zone. With typhoid bacillus a clear zone, then a faintly intensified zone about half the breadth. The most peculiar reaction obtained in all the experiments was one with cadmium and anthrax cultures. In this case a perfectly clear zone 5 millimetres wide was surrounded by an intensified zone 2 millimetres wide, and beyond that a second inhibitory clear zone about 1 millimetre wide. In some plates the secondary inhibitory zone was not entirely free from colonies, but it could always be made out distinctly.

Mercury also exhibited considerable differences in its reactions with various organisms, the most striking being in the case of the typhoid bacillus, where the intensified zone was more or less double, a narrow, almost clear zone running all around and dividing the intensified area into two zones. The bacillus coli communis gave a broad, clear zone, then an intensified zone, shading off on the outside. Though a good many experiments were made with concordant results, the author does not consider, however, that it would be safe to regard these reactions as characteristic until a greater number of tests have been made.

Antimony with staphylococcus pyogenes aureus gives a clear, sharp zone, about 1 centimetre broad, and then a zone of about 5 millimetres, with diminished growth. With the bacillus coli there is an inhibitory zone, 8 millimetres, with diminished growth, but no clear zone. The intensified zone is quite distinct and about 1 millimetre broad. The typhoid bacillus gave a somewhat similar reaction. Anthrax gave a very wide, clear zone, 1.8 centimetres, and an indistinct, intensified zone. With the cholera bacillus there was no sharply-marked clear zone, but diminished growth could be made out as far as 1.5 centimetres to 2 centimetres round the metal.

Bismuth with staphylococcus pyogenes aureus gave a clear zone about 2 millimetres wide, and an indistinct, narrow, intensified zone. With anthrax cultures there was a clear zone 1 millimetre wide. Bacillus pyocyaneus, bacillus coli communis, cholera and typhoid bacilli gave no reaction with bismuth. Pure nickel failed to give any reaction with most of the micro-organisms tested. There was a clear zone with an anthrax culture.

Bolton points out that evidently some metals have no marked effect on the growth of the bacteria tested, and it is precisely the metals which are resistant to chemical agents that fail to react, while those metals which are readily attacked by chemical reagents exhibit a marked inhibitory action on the growth of bacteria. The effect may be due to a solution of the metal in the medium, and traces of the metal have been detected by chemical tests in the nutrient medium surrounding the metal. The explanation of the intensified zone is more difficult. Bolton suggests two theories, but he makes no attempt to explain the second inhibitory zone.

The length of time of contact of metal with the agar in order to develop the inhibitory action was tried with brass, copper, cadmium, and zinc. With cadmium a clear space was evident after about a minute; with zinc the time was about the same; with brass and copper there was no clear space till the metal had been on for more than fifty minutes.

Action of Electrolysis on Bacteria.—S. Kruger ⁶⁹_{May 22, '06} states that experiments which he made concerning the action of electrolysis on the toxic and immunizing products of bacteria enable him to consider the following facts as established: 1. A constant current passing through non-polarizing electrodes, and, consequently, thus deprived of any real chemical action, prevents the growth of bacteria without killing them. 2. A constant current of a certain intensity and duration, passing through polarizing electrodes, is able to destroy bacteria. 3. In cases of infection by the pneumococcus and the cholera bacillus the subcutaneous injection of cultures treated by electrolysis causes the recovery of the infected animals. 4. The same is observed in experiments with cultures of diphtheria. With regard to this last, especially, Kruger obtained by electrolysis of diphtheritic bacilli, grown in Petri's boxes on agar-agar and made into an emulsion with a 1-per-cent. solution of sodium chloride, a liquid which may be compared to the anti-diphtheritic serum. Two cubic centimetres of this liquid, treated by electrolysis, suffice to immunize a rabbit or to cause its recovery if previously infected. The curative dose for a child of from 15 to 20 kilogrammes (33 to 44 pounds) would be from 20 to 26

cubic centimetres (5 to 6½ fluidrachms). In Kruger's opinion, electrolysis acts upon the cultures and bacterial poisons by oxidation and reduction processes, which are probably put into action by the living organism by which bacterial products and living bacteria have been ingested.

Bacteriological Technique.

Robert L. Pitfield, of Philadelphia, ⁹_{Sept. 7, '06} recommends a new method of staining flagella. It consists in the use of but a single solution, which is at once mordant and stain. The solution should be made in two parts, which are filtered and mixed.

A.

Saturated aqueous sol. of alum, . . . 10 c.cm. (2½ fluidrachms).
Saturated alcoholic sol. of gentian-violet, . . . 1 c.cm. (15½ minims).

B.

Tannic acid, 1 gm. (15½ grains).
Distilled water, 10 c.cm. (2½ fluidrachms).

The solutions should be made with cold water, and immediately after mixing the stain is ready for use. The cover-slip is to be carefully cleaned, the grease being burned off in a flame, and, after it has cooled, the bacteria are spread upon it, well diluted in water, care being taken to exclude culture-medium. After the preparation has been thoroughly dried in the air it should be held over the flame with the fingers, as Loeffler has directed. Afterward the stain is gradually poured on the slip and heated gently, bringing the fluid almost to a boil; the slip, covered with the hot stain, should then be laid aside for one minute, then washed in water, and mounted. Upon examination the bacteria, both isolated and in clumps, will, if motile, be found to have the flagella clearly and delicately defined. In the middle of the cover-slip, as well as around the edges, the bacteria will be found equally well stained; the clumps are surrounded by a zone of delicate, fringing flagella, each being well stained and distinctly outlined from its fellows.

A. M. Bleile, of Columbus, ⁹_{July 14, '06} recommends white of egg as a culture-medium treated in the following manner: White of egg is thoroughly shaken with ten volumes of water, and for every hundred cubic centimetres of this mixture one cubic centimetre of hydrochloric acid is added, with a few grains of pepsin, and the whole is kept in the incubator at 40° C. (104° F.) for four hours. The mixture is then neutralized with a solution of equal parts of sodium hydroxid and potassium hydroxid, boiled, and from 10 to 12 per cent. of gelatin or 1½ per cent. of agar added, again boiled and neutralized if necessary, and then filtered. This medium has

been in use in his laboratory for more than a year and has given general satisfaction. It presents several points of advantage over the ordinary media. In the first place, in the summer-time it is difficult to keep the meat-infusion the prescribed time without ice. The egg-medium has the advantage of a greater initial freedom from spores and bacteria; it does away with the use of the somewhat expensive peptone; it requires less weighing and only one filtering; it is fully as rich in nitrogenous matter as the meat-infusion, and it is richer in salts.

E. Mosny¹⁴_{Dec. 20, '96} states that the blood-serum of the rabbit, used without previous heating, represents the best culture-medium for the pneumococcus,—a fact to which he drew attention four years before. Whether used by itself or mixed with even considerable amounts (96 per cent.) of sterilized distilled water, this serum constitutes for the pneumococcus a culture-medium which is especially valuable in causing luxuriant growth, prolongation of its vitality, and the preservation of virulence. These qualities are not found in human serum, nor in that of the dog, ox, or sheep; they are not even found in the serum of such animals as the ass, which possesses a very high degree of receptivity for experimental pneumococcic infection, whether such serums are employed after heating or not, mixed with water to any amount or unmixed. Therefore, the qualities enumerated are absolutely special to the serum of the rabbit. Defibrinated blood of the same animal, whether liquid or solid, is in no way superior to serum for the culture of the pneumococcus. It is even inferior to serum, as its opacity makes it difficult to estimate exactly the growth of the microbes.

A. Gilbert and L. Fournier, of Paris,¹⁴_{Nov. 30, '96} described before the Society of Biology a new culture-medium. It consists in defibrinated blood coagulated by heat. Their object in allowing the figured elements of the blood to remain in the serum is to supply some bacteria with certain products which they find in the system itself, and which may be looked upon as helping their growth. It is well known what results Pfeiffer was able to obtain from this hypothesis, for it was due to the drop of blood which he spread over his agar-agar tubes that he succeeded in cultivating the micro-organism of influenza. The simplest method of obtaining the culture-medium consists in removing the fibrin from the blood taken aseptically from man or certain animals by shaking it in the sterilized flask in which it has been received. The liquid portion is then separated from the coagula of fibrin by means of a pipette, and is placed in tubes and coagulated by heat, like ordinary serum. The pneumococcus was one of the first microbes cultivated on the medium thus prepared. The aspect of

the colonies was completely unlike that of the transparent and barely visible colonies grown on agar-agar and ordinary serum. In thirty-six or forty-eight hours there is formed a wide, yellow line bounded by a narrow, green border, which is scarcely raised above the middle surface; the yellow line grows deeper and is soon noticeable at the posterior part of the tube, where the central portion of the serum forms but a shallow layer. The virulence and especially the vitality of the pneumococcus grown upon defibrinated blood last much longer than in ordinary media.

In a recent study on the modifications of the sputa of pneumonia Pannotti,⁵⁰⁵_{Nov. 24, '06} considered the yellow line and green border, etc., to be due to the action of the pneumococcus on hæmoglobin. Spectroscopical examination of the blood of a rabbit suffering from pneumonic septicæmia proved the point.

More recently Gilbert and L. Fournier, of Paris,¹⁴_{Jan. 16, '06} report that they have cultivated the pneumococcus upon the defibrinated blood of man, of the horse, the dog, and the rabbit. Blood taken from patients suffering from pneumonia and from convalescents acted like blood taken from normal individuals, the virulence of the germs cultivated being left out of the question. Horse-blood gave certain special results which the author will consider later on. The other varieties of blood gave cultures which were similar, the blood being employed either in a liquid or in a solid state.

I. Defibrinated liquid blood. When sown in liquid defibrinated blood and kept at 33° C. (91.6° F.) the pneumococcus grows rapidly and copiously, forming a capsule around itself, as in serum. Its vitality, its power of vegetation, and its virulence are retained to a remarkable extent. It is impossible to assign an actual limit, but the authors have in their possession at the present moment cultures more than two months old, which have been kept in the incubator and which are thickened and almost dried up, but which can be resown and are capable of killing a mouse in from twenty-four to thirty-six hours. Now, it is known that the culture-media actually employed for the pneumococcus permit it to retain its vitality and virulence but a few days.

Under the influence of the growth of the pneumococcus the defibrinated blood changes in color; in twenty-four hours it becomes of the hue of dregs of wine, and later on it tends more and more to assume the aspect of light-colored prune-juice or of a week infusion of coffee. These physical changes are due to the transformation of hæmoglobin into methæmoglobin.

As is well known, Hayem, in particular, proved the fact that a certain number of toxic products can change hæmoglobin into methæmoglobin. The authors tried to ascertain whether the

appearance of methæmoglobin in the defibrinated blood was due to the toxins of the pneumococcus. When defibrinated blood, which had not been inoculated, was mixed with serum in which the pneumococcus had been cultivated, spectroscopical examination gave no sign of the transformation of oxyhæmoglobin into methæmoglobin. The blood of a pneumonia patient was likewise examined with the spectroscope without showing the presence of methæmoglobin.

II. Solidified defibrinated blood. When sown upon defibrinated blood solidified by heat the pneumococcus does not form a culture in relief, but penetrates into the nutrient medium, within which it multiplies actively. Its vitality and its virulence are long retained, though they remain very much less than what is obtained by means of the liquid form. Its vitality does not last longer than a month nor its virulence more than ten days.

A certain number of bacteria, other than the pneumococcus, were sown upon solidified defibrinated blood,—namely: Friedländer's pneumobacillus, the influenza bacillus, the diphtheria bacillus, the anthrax bacterium, Eberth's bacillus, the bacterium coli commune, the streptococcus and the staphylococci. Without deciding as to the streptococcus, it may be said that such bacteria grow in surface upon blood as on serum and exert no decolorizing influence upon the hæmoglobin of the nutrient medium.

Thus, solidified defibrinated blood may not only be used for the culture of the pneumococcus and for the long preservation of its vitality and virulence, but also for its bacteriological diagnosis and to separate it from other bacteria.

W. St. C. Symmers, of Aberdeen, ²_{Oct. 27, '94} states that the loss of time bacteriologists have to contend with in filtering agar-agar would be avoided if the French "*papier-chardin*" were employed. In using this filter-paper the hot agar-agar is found to filter as rapidly as nutrient gelatin does in the ordinary method. A litre (quart) may be thus obtained in half an hour, and this result follows without the necessity of using a hot-water funnel. All that is required is to heat the agar-agar in an autoclave to 120° C. (248° F.), and as quickly as possible pour it on to the filter-paper in a cold funnel.

Bleisch ⁵⁰_{Mar. 22, '95} recommends a simple apparatus rendering filtration unnecessary. It consists of a long, round glass vessel of about two litres' capacity. The lower end is closed by a rubber cork through which a glass tube, closely fitted, but movable, extends upward toward the top. The lower end of the glass tube has a rubber tube and pinch-cock attached. The whole apparatus is supported in a wooden frame. When ready for use the agar-

agar—which is best neutralized with sodium phosphate, as this reagent causes a much more rapid sedimentation than the ordinarily employed sodium hydrate and carbonate, and which has been sufficiently well boiled after neutralization—is poured in and allowed to stand in a warm apparatus at a temperature of 50° to 60° C. (122° to 140° F.) until sedimentation has occurred and the upper portion of the fluid is clear. The inner glass tube, which during the process of sedimentation has extended above the surface of the agar-agar, is now gently slid down until it is a few centimetres below its level. When the pinch-cock is opened the clear fluid flows down the tube into a receiving vessel. As soon as the fluid descends to the level of the tube, it is withdrawn a little more, and more fluid removed. By gradually withdrawing in this manner, the fluid is not agitated so as to disturb the precipitate, a small quantity of which will, of course, remain to be thrown away.

Neisser, of Breslau, ⁵⁸_{1892, 96} considers the microscope much more reliable than the macroscopical method usually employed for counting bacterial colonies, unless the number of colonies is less than 600. Even then, if several cubic centimetres, instead of the usual smaller amount, are incorporated into the plated gelatin and then the microscope employed for the enumeration, the tendency to error is considerably lessened. Petri dishes, with level, smooth bottoms, are advisable; and the microscope should have a large, rotating stand-plate, such as is found on the best Zeiss stands. A good, coarse adjustment is needed; the objective should have a large field of vision; the eye-piece should be strong and contain a micrometer made in the usual way of a glass plate having twenty-five squares ruled within the large square on its centre. The Abbé condenser is removed for the counting process.

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779. North Amer. Practitioner, Chicago.
780. Annales de la Polyclinique de Bordeaux.
781. L'odontologie, Paris.
782. Journal d'électricité médicale, Paris.
783. Nowiny lekarske, Posen.
784. Revista médica de México.
785. El tula médica de Valladolid.
786. St. Louis Clinique.
787. Lehigh Valley Medical Magazine, Easton, Pa.
788. Il Progreso de gynecologia y pediatria, Madrid.
789. Le progrès dentaire, Paris.
790. Nederlandsch Tijdschrift voor Verloskunde en Gynæcologie, Haarlem.
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793. Journal of the Quekett Microscopical Club, London.
794. Memorie della reale Accademia della scienze dell' Istituto di Bologna.
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796. Archives de zoologie expérimentale et générale, Paris.
797. Alger médical, Algiers.
798. Revue mensuelle des maladies des yeux, Paris.
799. Zeitschrift für Ethnologie, Berlin.

800. Mediizinskija pribawlenija k morskomu sborniku, Moscow.
801. Kansas Medical Journal, Topeka.
802. Lo spallansani, Rome.
803. Internationale Monatsschrift für Anatomie und Physiologie, Leipzig.
804. Monatsschrift des Vereins deutscher Zahnkünstler, Leipzig.
805. Dental Cosmos, Philadelphia.
806. Archives of Surgery, London.
807. Journal für Zahnheilkunde, Berlin.
808. International Dental Journal, Philadelphia.
809. Zeitschrift für angewandte Chemie, Berlin.
810. Quarterly Journal of Microscopical Science, London.
811. Toledo Medical and Surgical Reporter, Toledo, Ohio.
812. Biologiska föreningens förhandlingar, Stockholm.
813. Mississippi Med. Monthly, Meridian.
814. American Medico-Surgical Bulletin, New York.
815. Sanitary World, London.
816. Bollettino della Società fiorentina d'igiene, Florence.
817. Canada Health Journal, Ottawa.
818. Journal of British and Foreign Health Resorts, London.
819. La terapia moderna, Padua.
820. Medical Sentinel, Portland, Oregon.
821. Revista médico-quirurgica, Cadiz.
822. Southern Dental Journal, Atlanta.
823. Archivio della riforma medica, Naples.
824. Quarterly Medical Journal, Sheffield, England.
825. Annales des sciences psychiques, Paris.
826. Notes on New Remedies, New York.
827. Le mercredi médical, Paris.
828. Untersuchungen aus dem physiologischen Institut der Universität, Halle.
829. Pharmaceutical Journal of Australasia, Sydney, N. S. W.
830. Revista internazionale d'igiene, Naples.
831. Revista de higiene y policia sanitaria, Barcelona.
832. Sbornik lékarský, Praze. Archives bohêmes de médecine.
833. L'anthropologie, Paris.
834. La psichiatria, Naples.
835. Revista de medicina dosimetrica, Madrid.
836. Annalen der Physik und Chemie, Leipzig.
837. Zeitschrift für Nahrungsmittel-Untersuchungen und Hygiene, Vienna.
838. Duodecim, Helsinki.
839. Bollettino della Società Lancisiana, Rome.
840. Bulletin de la Société impériale des naturalistes, Moscow.
841. British Journal of Dental Science, London.
842. Journal of the British Dental Association, London.
843. Journal de médecine pratique, Paris.
844. Oesterr-ungar. Centralblatt für die medicinischen Wissenschaften, Vienna.
845. Medical Magazine, Lahore, India.
846. Harper Hospital Bulletin, Detroit.
847. Der oesterreichische Sanitäts-Beamte, Vienna and Berlin.
848. Mémoires couronnés et autres mémoires publiés par l'Académie royale de médecine de Belgique, Bruxelles.
849. Quarterly Atlas of Dermatology, St. Louis.
850. Northwestern Medical Journal, Minneapolis.
851. Wojenno meditzinskij shurnal.
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853. Revue d'orthopédie, Paris.
854. Centralblatt für allgemeine Pathologie und pathologische Anatomie, Freiburg i. B.
855. Modern Medicine and Bacteriological World, Battle Creek, Mich.
856. Western Medical and Surgical Reporter, St. Joseph, Mo.
857. Annales de la Asistencia Publica, Buenos Ayres.
858. Johns Hopkins Hospital Reports, Baltimore.
859. Bolnitchnaja gazeta Botkina.
860. Revue générale des sciences pures et appliquées, Paris.
861. Oesterreichische aertzliche Vereinszeitung, Vienna.
862. Bulletin médical de l'Algérie.
863. Der Kinder-Arzt, Worms.
864. American Medical Journal, St. Louis.

865. Bulletin de la Société française de dermatol. et de syphiligraphie, Paris.
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869. American Chem. Jour., Baltimore.
870. Balneologisches Centralblatt, Munich.
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874. Gazette des Hôpitaux de Toulouse.
875. Helsovännan. Tidskrift för allmän och enskild hälsovård, Göteborg.
876. L'idrologia e la climatologia medica, Florence.
877. Klinicheskij sbornik gositalnoi terapevticheskii kliniki imperatorskago Varschavskago Universiteta. Nabloudenija i izsledovanija, Warsaw.
878. New England Med. Gazette, Boston.
879. Revue d'hygiène thérapeutique, Paris.
880. Zeitschrift für analytische Chemie, Wiesbaden.
881. Zeitschrift für Fleisch- und Milchhygiene, Berlin.
882. Wiadomosci farmaceutyczne, Warsaw.
883. Diario del San Benedetto in Pesaro.
884. Tidskrift i militär Hälsovård, Stockholm.
885. Sanitarne Dielo. Organ obchestvennoi i chastno higienij, St. Petersburg.
886. Rassegna critica internazionale delle malattie del naso, gola e orecchio, Naples.
887. Pamietnik towarzystwa lekarskiego Warszawskiego, Warsaw.
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889. New York Medical Times, N. Y.
890. American Ophthalmological Monographs, Cincinnati.
891. Maandblad uitgegeven door de Vereeniging tegen de Kwakzalverij, Amsterdam.
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895. Le Dauphiné médical, Grenoble.
896. Journal de médecine et de pharmacie de l'Algérie, Algiers.
897. Zeitschrift für Psychologie und Physiologie der Sinnesorgane, Hamburg.
898. Toledo Med. Compend, Ohio.
899. Sbornik rabot hygienicheskoi laboratorii Moskovskago Universiteta, Moscow.
900. Rivista generale italiana di clinica medica, Pisa.
901. Medical Times and Gazette, London.
902. Journal für praktische Chemie, Leipzig.
903. Schweizerische Wochenschrift für Pharmacie, Schaffhausen.
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905. La Clinique Internationale, Paris.
906. Journal of Balneology, New York.
907. Revista clinica de los hospitales, Madrid.
908. Bulletin de la Société de chirurgie, Paris.
909. Revue odontologique, Paris.
910. Oesterreichisch-ungarische Vierteljahresschrift für Zahnheilkunde, Vienna.
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912. Dental Record, London.
913. Archivio per l'anthropologia e la etnologia, Florence.
914. Jour. of Electro-Therapeutics, N. Y.
915. Rivista d'igiene e sanità pubblica con Bollettino sanitario amministrativo compilato sugli atti ufficiali del ministero dell' interno, Rome.
916. Anales de la real Academia de medicina, Madrid.
917. Boletin de medicina naval, Madrid.
918. Arch. internacionales de laringología, otología, rinología, Barcelona.
919. Deutsche Revue, Breslau and Berlin.
920. Comptes rendus hebdomadaires des séances de l'Académie des sciences, Paris.
921. Il policlinico, Rome.
922. Correspondenzblatt der Aerztekammer und der Aerztevereine der Provinz Brandenburg und des Stadtkreises, Berlin.
923. Semanario farmacéutico, Madrid.

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925. Anales del circulo medico argentino, Buenos Ayres.
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927. Comptes rendus hebdomadaires des séances et mémoires de la Société de biologie, Paris.
928. Studies from the Laboratory of Physiological Chemistry, Sheffield Scientific School of Yale College, New Haven, Conn.
929. Repertorio medico-farmacéutico y de ciencias auxiliares, Havana.
930. Hygien. Rundschau, Königsberg i. P.
931. Gaceta sanitaria de Barcelona.
932. Journal der pharmacie von Elsass-Löthringen, Strassburg.
933. Onderzoekingen gedan in het physiologisch Laboratorium, der Leidse Hoogeschool, Leiden.
934. Rivista italiana di terapia e igiene, Piacenza.
935. Andalucfa médica, Cordova.
936. Bollettino della Associazione medica lombarda, Milan.
937. Revue biologique du nord de la France, Lille.
938. Onderzoekingen gedan in het physiologisch Laboratorium der Utrecht'sche Hoogeschool, Utrecht.
939. Revista de enfermedades de la infancia, Barcelona.
940. L'Orosi. Giornale di chimica, Florence.
941. Journal de pharmacologie, Bruxelles.
942. Gazette médico-chirurgicale de Toulouse.
943. Annali di ostetricia e ginecologia, Milan.
944. Bollettino dell' Associazione nazionale dei medici comunali, Rome.
945. Bulletin de pharmacie de Lyon, Lyons.
946. Dietetic and Hygienic Gazette, New York.
947. Bollettino farmaceutico, Rome and Milan.
948. California Med. Jour., San Francisco.
949. Chemisches Centralblatt, Leipzig.
950. Maandblad tegen de vervalschingen, Amsterdam.
951. Medicina científica basada en la fisiologia y en la experimentacion clinica, Mexico.
952. Revista farmacéutica, Buenos Ayres.
953. Pharmaceutische Zeitung, Berlin.
954. Nederlandsch militair geneeskundig Archief van de Landmacht, Zeemacht, het Oost- end West-Indisch Leger, Leiden.
955. Archives néerlandaises des sciences exactes et naturelles, Haarlem.
956. Bollettino del manicomio provinciale di Ferrara.
957. Gazzetta delle cliniche, Naples.
958. Archiv für öffentliche gesundheitspflege in Elsass-Löthringen, Strassburg.
959. Revue d'hypnologie théorique et pratique, Paris.
960. Physiological Laboratory, Harvard Medical School, Boston.
961. Organ der Taubstummen-Anstalten in Deutschland und den deutsch-redenden Nachbarländern, Friedburg.
962. Bollettino della reale Accademia medico-chirurgia di Napoli.
963. Corréo médicocastellano, Salamanca.
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965. Wochenschrift für Thierheilkunde und Viehsucht, Munich.
966. Physio-Medical Journ., Indianapolis.
967. Ny pharmaceutisk Tidende, Copenhagen.
968. Monthly Sanitary Record, Columbus, Ohio.
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987. Geneeskundige Courant voor het Koninkrijk der Nederlanden, Tiel.
988. Western Mental Journal, Kansas City, Mo.
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995. Archiv psichiatrii, neirologii i ssubdebnoj psychopatologii, St. Petersburg.
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997. Gazzetta Medica di Torino.
998. Medical and Surgical Observer, Jackson, Tenn.
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1002. Giornale speciale di Farmacia Sperimentale e chimica clinica, Naples.
1003. Veterinary Journal, London.
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1005. Deutsche Zeitschrift für Nervenheilkunde, Heidelberg.
1006. Journal of Comparative Neurology, Granville, Ohio.
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1010. Climatoterapia, Barcelona.
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1012. Therapeutic Review, New York.
1013. International Clinica, Philadelphia.
1014. Boletin de sanidad militar, Buenos Ayres.
1015. Annales d'hypnologie et de psychiatrie, Paris.
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1017. American Dermatologist, Indianapolis.
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1031. New York Medical Examiner.
1032. National Popular Review, San Diego, Cal.
1033. The Prescription, Danbury, Conn.
1034. Revue chirurgicale, Paris.
1035. Revue de thérapeutique générale et thermale, Paris.
1036. Wochenschrift für Chemie und Pharmacie.
1037. Bulletins de la Société française d'hygiène, Paris.
1038. Le Languedoc Médical, Toulouse.
1039. Annali di nevrologia, Naples.

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1043. Archives provinciales de chirurgie.
1044. Revue du Dispensaire du Louvre, Paris.
1045. La Roumanie Médicale, Bucharest.
1046. Utchenyia Zapiski Kasanskaho Veterinärnaho Instituta.
1047. Pharmaceutische Centralblatt.
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1049. Zeitschrift des allgemeinen österreichischen Apotheker-Vereines, Vienna.
1050. Revista de la Sociedad medica Argentina, Buenos Ayres.
1051. Revue de la Tuberculose, Paris.
1052. Chicago Medical Recorder.
1053. Bulletin of the Harvard Medical School Association, Boston.
1054. The General Practitioner, St. Louis.
1055. Indian Medical Reporter, Calcutta.
1056. Hygieia, Stuttgart.
1057. Journal d'hygiène populaire, Montreal.
1058. Food, New York.
1059. Chicago Lancet.
1060. Climates and Resorts, Chicago.
1061. Archives d'électricité médicale, Bordeaux.
1062. Revista de Higiene, Bogotá.
1063. Charlotte Medical Journal, Charlotte, N. C.
1064. The Corpuscle, Chicago.
1065. Florida Medical and Surgical Reporter.
1066. La Revista Médico Quirúrgica, New York.
1067. The Alkaloid, Chicago.
1068. Tablettes mensuelles de la Société royale de médecine publique de Belgique, Bruxelles.
1069. The Medical Press, New York.
1070. Health and Home, Louisville, Ky.
1071. Revue Théorique et Pratique des Maladies de la Nutrition, Paris.
1072. Ontario Medical Journal, Toronto.
1073. Journal of State Medicine, London.
1074. Psychiatrische Jahrbucher.
1075. New York Polyclinic.
1076. American Journal of Surgery and Gynecology, Kansas City.
1077. The Clinical Journal, London.
1078. Yūjno-Rūskaia Meditzinskaia Gazeta, Odessa.
1079. Sanative Medicine, Westerville, O.
1080. Chicago Clinical Review.
1081. Revista médico-social, Madrid.
1082. Budapester Hygienischer Zeitung.
1083. Revue médicale de la Franche-Comté.
1084. Aerztliche Rundschau.
1085. Archivii ed atti della Società Ital. di Chirurgia.
1086. Medicinsk Revue, Bergen.
1087. Shurnal russkago obschtschestwa ochranenija narodnago sdraivija, St. Petersburg.
1088. Le Midi Médical, Toulouse.
1089. Zeitschrift für Hypnotismus.
1090. Revue Neurologique, Paris.
1091. Leeward Islands Medical Journal.
1092. Indian Medico-Chirurgical Review, Bombay.
1093. Medical Magazine, London.
1094. Boletin del Consejo Superior de Salubridad de Guadalajara.
1095. La Puglia Medica, Bari.
1096. Revue générale de médecine, de chirurgie et d'obstétrique, Paris.
1097. Archivio internazionale di medicina e chirurgia, Naples.
1098. Woman's Medical Journal, Toledo.
1099. Gross Medical College Bulletin, Denver.
1100. Magyar Orvosi Archivum, Budapest.
1101. Archives des Sciences biologiques, St. Petersburg.
1102. Gazzetta Medica di Pavia.
1103. Dental Practitioner, Buffalo.
1104. Le Trimestre Médical, Brussels.
1105. Archivio italiano di otologia, rino-logia, e laringologia, Turin.
1106. La Médecine Nouvelle, Paris.
1107. Annales für Hydrographie, Berlin.
1108. Abeja Medica, Havana.
1109. Anatomische Hefte, Giessen.
1110. Annales de le Policlinique de Lille.
1111. Bolétin del Manicomio de San Baudilio de Llobregat, Barcelona.
1112. Electricidad Médica, Barcelona.
1113. Gazzetta medica delle puglie, Bari, Italy.
1114. Gaceta Medica Municipal, Havana.
1115. Heraldico Medico-Farmacéutico, Madrid.

1116. Internationale Monatschrift zur Bekämpfung der Trinksitten, Bremerhaven.
1117. L'Univers Médical, Paris.
1118. La Higiene, Havana.
1119. Medicinische Novitäten, Leipzig.
1120. Odontoskop, Budapest.
1121. Prensa Medica de Malaga.
1122. Veshukdorpon (Mirror of Medicine, Bengali), Calcutta.
1123. Western Medical Record, Chicago.
1124. Wisconsin Medical and Surgical Journal, Waukesha, Wis.
1125. Zeitschrift für Nervenheilkunde, Erlangen.
1126. Revue internationale de Thérapeutique et de Pharmacologie, Paris.
1127. El Agricultor, Bogotá.
1128. Revue Médico-chirurgicale du Brésil.
1129. Annales de l'Institut de Pathologie et de Bactériologie, Bucharest.
1130. Ungarisches Archiv für Medicin, Budapest.
1131. Giornale dello istituto Nicolai, Milan.
1132. Annales médico-chirurgicales du Cercle médical borain, Paturages.
1133. McCaskey's Clinical Studies, Fort Wayne.
1134. Journal médical de l'Armée, Athens.
1135. St. George's Hospital Gaz., London.
1136. Northumberland and Durham Medical Journal, England.
1137. Rhode Island Medical Science Monthly, Providence.
1138. St. Joseph Medical Journal, St. Joseph, Mo.
1139. Journal de Clinique et de Thérapeutique infantile.
1140. Hospital Bulletin of the Second Minnesota Hospital.
1141. Balneologische Rundschau.
1142. La Pædiatria.
1143. Boletin de Medicina de Santiago.
1144. The Tri-State Medical Journal, Keokuk, Ia.
1145. Le Limousin Médical.
1146. Chugai Ijishimpo, Tokio.
1147. Archivis di pharmacologia e terapeutica.
1148. Gyógysz Kozl, Hungary.
1149. Annales de la Polyclinique de Toulouse.
1150. Mathews's Medical Quarterly.
1151. Archiv für Laryngologie.
1152. Louisville Medical Monthly.
1153. La Presse Médicale, Paris.
1154. New York State Medical Reporter, Rochester.
1155. Revue Mensuelle de Stomatologie, Paris.
1156. Rivista di Patologia e Terapia delle Malattie della Gola, del Naso, e dell' Orecchio, Florence.
1157. Dermatologische Zeitschrift, Berlin.
1158. Gazette hebdomadaire de la Russie Meridionale, Odessa.
1159. Teratologia, London.
1160. La Flandre Médicale, Ghent.
1161. The Refractionist, Boston.
1162. German-American Medical Journal, St. Louis.
1163. Louisville Medical Monthly, Louisville.
1164. The Railway Surgeon, Chicago.
1165. La Lancetta, Cienfuegos.
1166. Revista Estomatologica, Madrid.
1167. Archivio italiana di clinica medica.
1168. La Clinique, Montreal.
1169. Monatschrift für prakt. Wasserheilkunde, etc., Munich.
1170. Medicine, Detroit.
1171. New York Eye and Ear Infirmary Reports.
1172. The National Medical Review, Washington.
1173. Annali di Medicina Navale, Rome.
1174. The Colo. Climatologist, Denver.
1175. La Polyclinique, Bruxelles.
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1177. Cronica di clin. med. di Genova.
1178. Deutsche Monats. f. Zahnheil.
1179. Pacific Druggist and Physician, San Francisco.
1180. Journal Odontologique.
1181. La Médecine Infantile, Paris.
1182. Journal of Medicine and Science, Portland, Me.
1183. Bulletin of the American Academy of Medicine, Easton, Pa.
1184. Archives de Pharmacodynamie, Paris.
1185. La Bourgogne Médicale.
1186. Cleveland Journal of Medicine.
1187. Intercolonial Quarterly Journal of Medicine and Surg., Melbourne.
1188. Atlantic Medical Weekly, Providence.

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BOOKS, MONOGRAPHS, THESES, ETC.

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